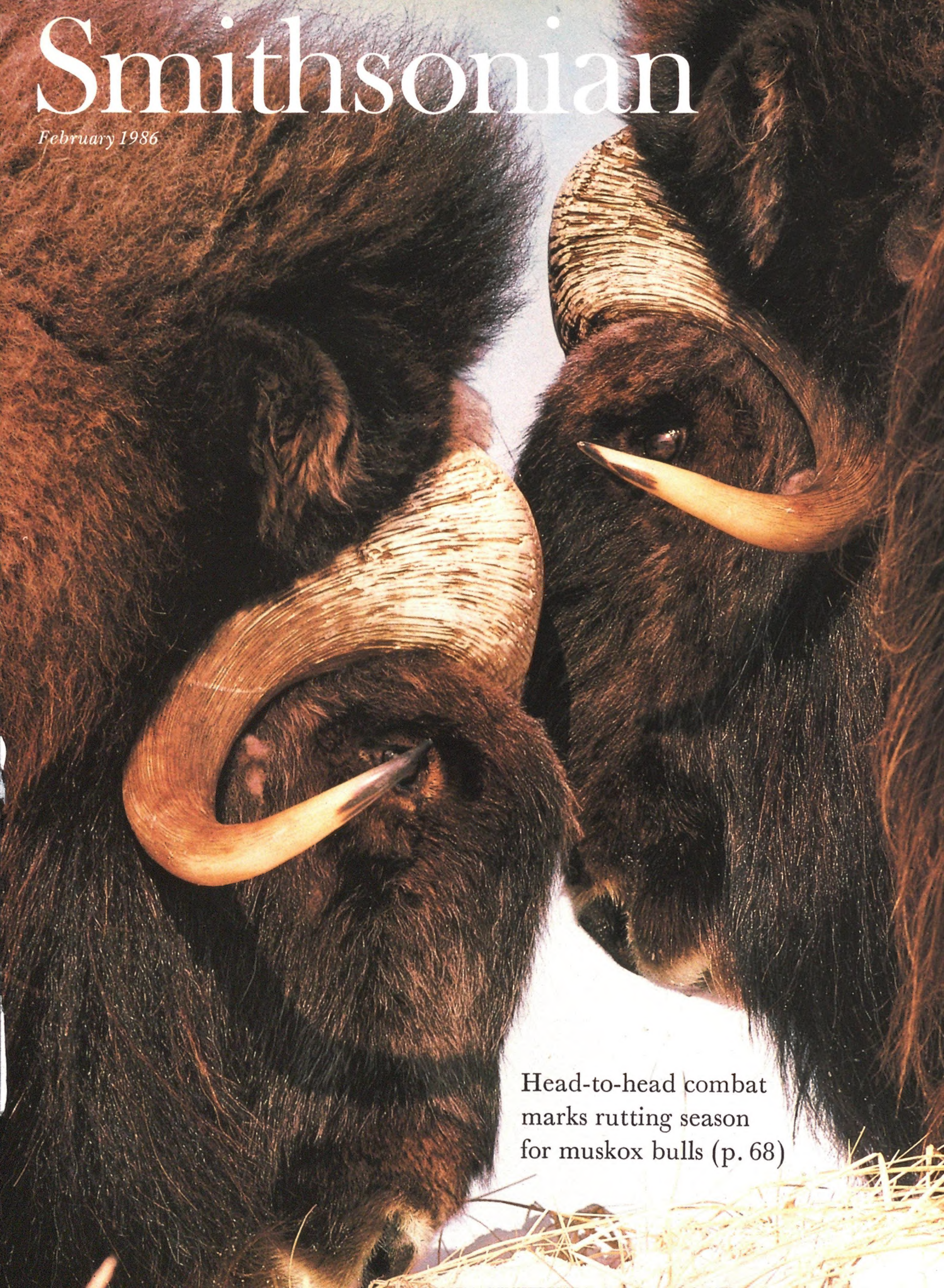
Smithsonian

February 1986



Head-to-head combat marks rutting season for muskox bulls (p. 68)

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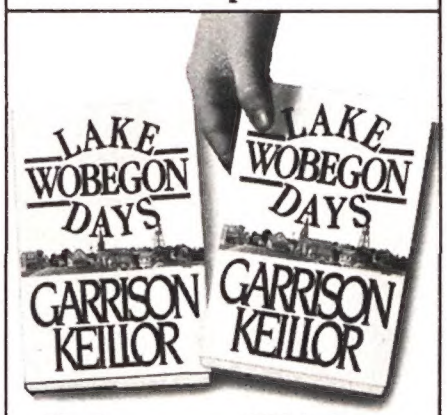

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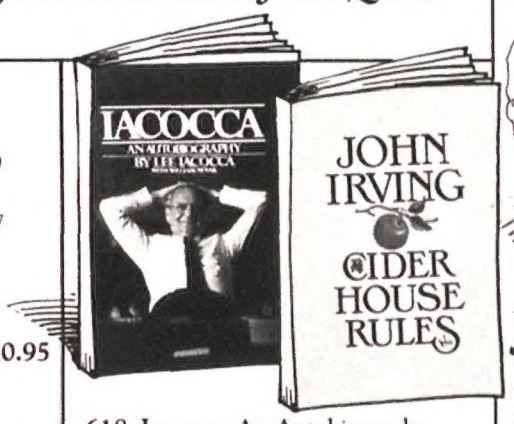

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February 1986

Smithsonian

Volume 16, Number 11

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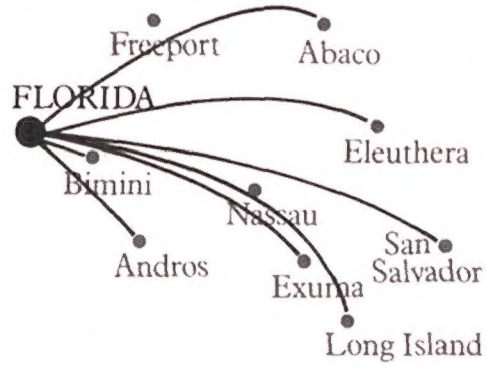

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Shirley Temple dolls — an established category of heirloom dolls

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Her peaches and cream complexion will be lovingly painted by hand.

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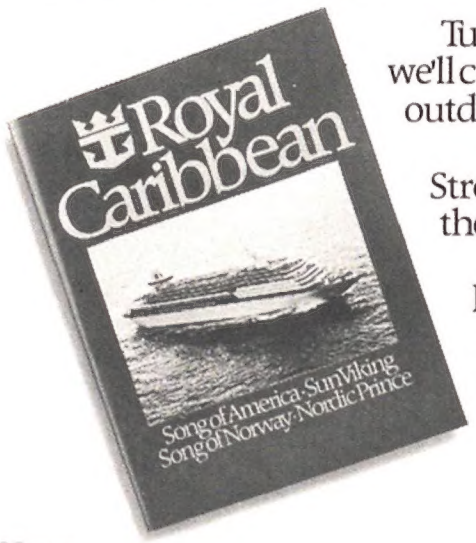

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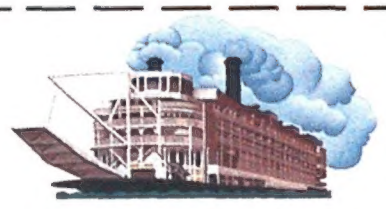

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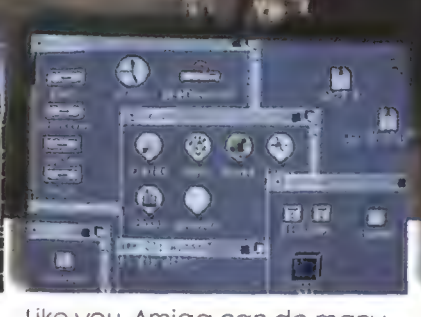

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Secretary Adams' comments

Smithsonian horizons

Formal agreements with the USSR for scholarly access are necessary, even when the results are not ideal

Formal international agreements to promote and assure the work of scholars and scientists are indispensable but sometimes deeply troubling. The International Research and Exchanges Board (IREX) is one of the private bodies in the United States charged with negotiating and implementing such agreements. I recently participated in its discussions in Moscow with the Soviet Academy of Sciences for the renewal of an agreement covering the social sciences and humanities—the success of which owed much to the afterglow of the November Summit—but I am uneasily aware that the need and the disquiet are closely linked.

Each side must take steps to improve its understanding of the underlying, historically rooted considerations on which the other acts. Yet such understanding is very difficult to achieve—perhaps in our case because of the surfeit of information we produce about ourselves and (for the most part) freely circulate, while the Soviet case is somewhat the reverse.

Conditions of access cannot be assured by one side acting alone. Although an open society such as ours may resent the need for them, there must be formal agreements covering academic access if we are to reduce to a tolerable level surprise and uncertainty in the key arena of international relations.

Moreover, the public objective of improving great-power relations is only one consideration. We, at least, cherish and insist upon the freedom and autonomy of individuals. The pursuit of knowledge in its own right, wherever it may lead, surely occupies a high place within our own conception of freedom. No matter that other nations may regard international travel and rights of access to new knowledge as privileges rather than rights. Within our system of values we should encourage "the increase & diffusion of knowledge" (to borrow a phrase from James Smithson's will) through whatever agreements may promote the rights of scholars and advance this end.

But flip the coin and consider the other side. Scholarly agreements are matters of mutual concession. They seldom convey unrestricted rights, and they involve our acquiescence (if not complicity) in imposing the more or less restrictive conditions that are the best we can obtain. These mutually acceptable formulas make no reference to the larger differences between us with regard to individual rights and the pursuit of disinterested scholarship.

Beyond general agreements, individual cases need to be tenaciously followed up. Measures must be taken to balance the flow in both directions so as to give reasonable representation in all fields. Finally, no agreements can be allowed completely to circumscribe what we do and think. If there can be no official acknowledgment of the exclusion of "refusenik" scholars from the Soviet academic establishment, how can we show our support for the refuseniks' position in other ways?

Shortly before the Moscow meeting, the Smithsonian, jointly with the Social Science Research Council, sponsored a conference on problems of international research access. Its themes were well exemplified in negotiations that followed.

Not many countries regard the advancement of knowledge (especially by foreigners and about themselves) as an objective with much moral force of its own. But in some ways our arrangements with the Soviets are ironically far in the lead. By dint of long and sometimes painful negotiations, our mutual research interests have been well defined and codified. A process is in place that assures a substantial measure of bilaterality and compliance. We may all hope for a better world in which scholars and scientists will one day be able to move about and cooperate with one another freely. But for the present we probably must rely instead on laboriously negotiated, partial substitutes.

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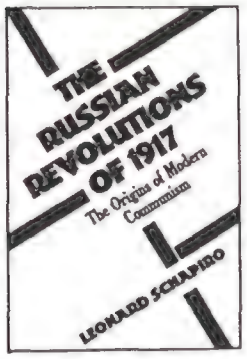

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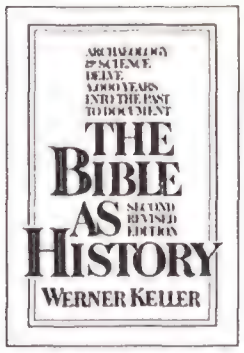
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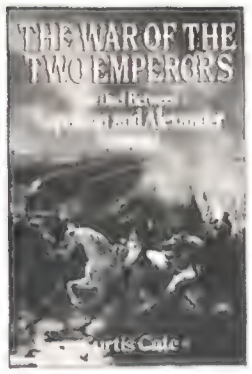

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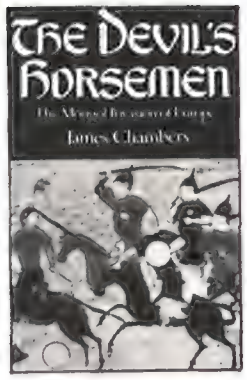

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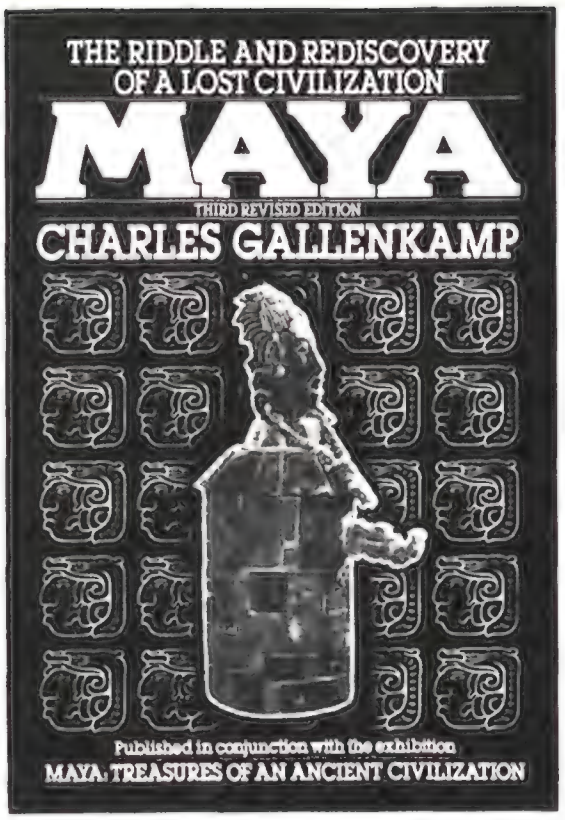
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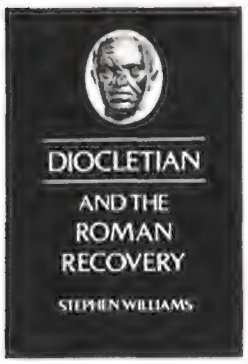

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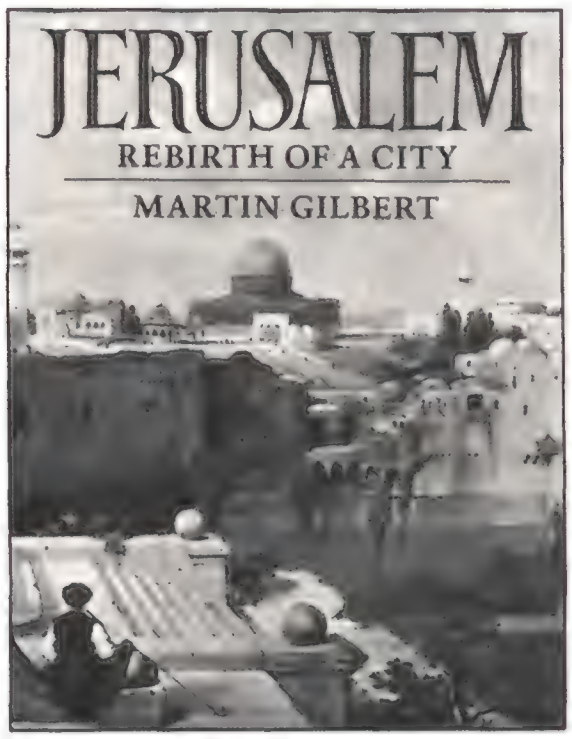

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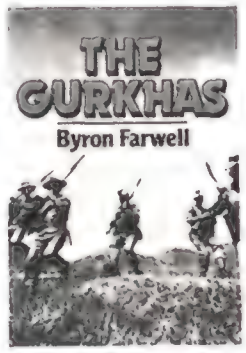

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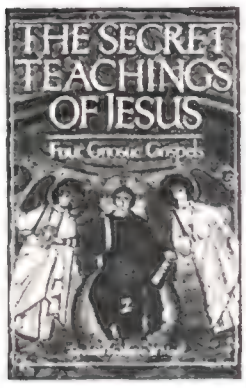

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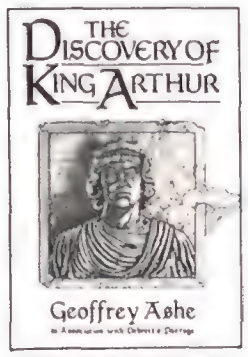

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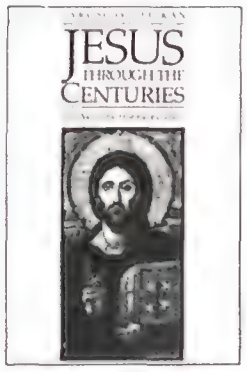

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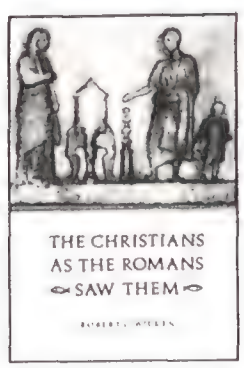

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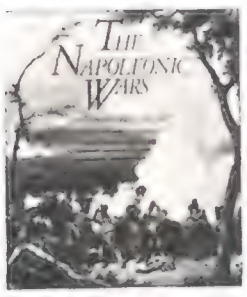

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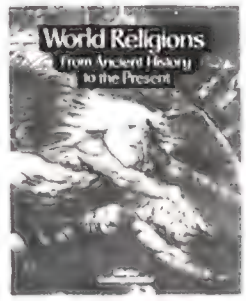

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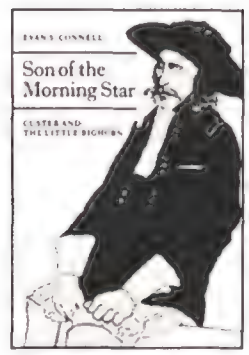

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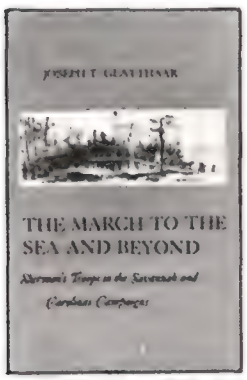

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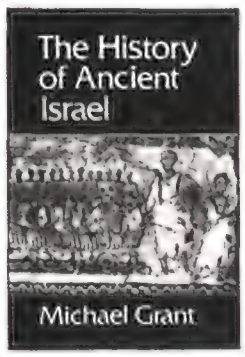

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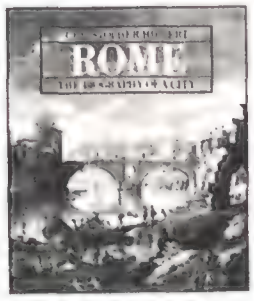

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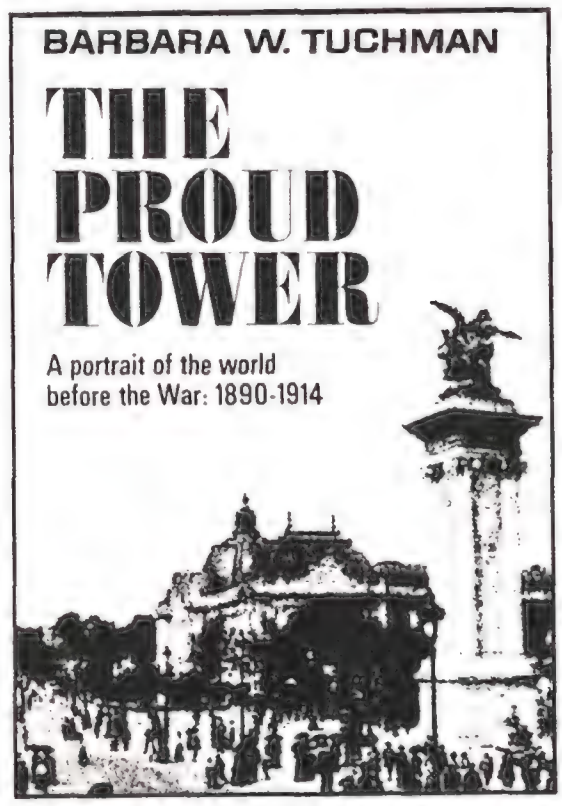

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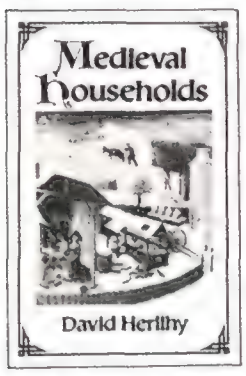

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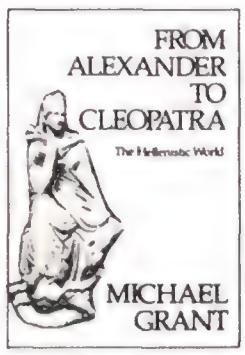

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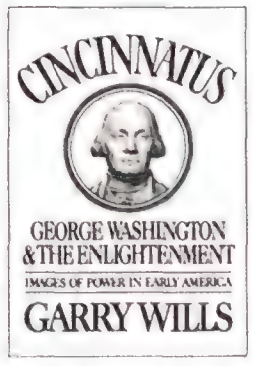

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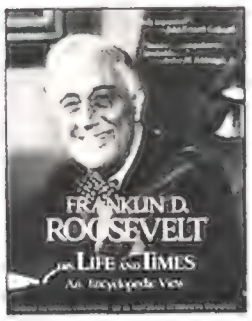

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Letters to the Editor

Sauk Centre

Dear Sir: Your December article called to mind October 1947, when I was acting assistant manager at the Old Mission Inn on Madeline Island at La Pointe, Wisconsin. It was post-season and one day, after making up two rooms for some expected guests, I was ensconced before a blazing fire awaiting their arrival. When the party of four came in, I greeted them, saw them registered and bellhopped their luggage upstairs. Later I was in the dining room to seat them, take their order, go to the kitchen, prepare their meal and serve it. For all this I was rewarded with my very first tip ever—in those days a biggie—50 cents!

From Sinclair Lewis and friends!

Susan E. Soucheray
Bayfield, Wisconsin

Exotic edibles

Dear Sir: One fruit to which I saw no reference is the jaboticaba, a favorite of mine from my years in Brazil. This luscious fruit is borne on a tree that is a cousin to our own southern crepe myrtle.

William S. Smith
Murfreesboro, Tennessee

Dear Sir: Dr. Vietmeyer may know his exotic fruits, but he'll have to bone up on ethnic foods. Chilies are used in Mexican dishes, not Spanish.

Hank Perea
Culver City, California

Julia Morgan

Dear Sir: I should like to question the notion that Morgan died penniless. Her

World Wildlife Fund announces an original work of art in hand-painted porcelain.

Hi There!

Newest work in the distinguished series of baby animal sculptures in porcelain from the World Wildlife Fund.

Art of fascination and charm at the attractive price of $45.

The World Wildlife Fund has undertaken the creation of a delightful collection of porcelain sculptures of baby animals.

Hi There! portraying a charming little panda, has just been completed for this collection. It is crafted in fine porcelain—entirely hand-painted—and is being issued at the modest price of $45, which itself is payable in convenient monthly installments of $15 each.

This new and original work of art has been designed *exclusively* for the World Wildlife Fund by Eva Dalberg, one of the world's most gifted portraitists of animals. Dalberg was chosen for this commission because of her very special ability to capture in art the charm and affectionate quality of baby animals.

Here, the little panda is portrayed in an amusing situation—eyeing a tiny caterpillar as it moves defiantly toward him along a bamboo branch, wondering how it ever had the colossal nerve to get *this* close!

This intriguing new sculpture will be crafted in fine porcelain and completely painted by hand. So every color and detail will be clear, crisp and exact. The caterpillar's slinky green body and upturned head. The panda's black-rimmed eyes, perky ears, chubby feet—and that curious expression of puzzlement on his face!

Hi There! will be crafted for the World Wildlife Fund, under the supervision of Franklin Porcelain. Each imported sculpture will be backmarked with the official "WWF" symbol.

You will enjoy displaying this charming little panda in your home and showing it to your friends. And you'll have the satisfaction of knowing it is created in a long-established tradition. For of all porcelain pieces collectors prize, figures of baby animals are among the most popular.

To reserve your sculpture, send the application at right to the World Wildlife Fund, c/o Franklin Porcelain, Franklin Center, PA 19091, by February 28, 1986.

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Limit of one sculpture per person.

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will, available to scholars in the California Polytechnic State University Library's Special Collections, shows that she left three houses, stocks and bonds and a valuable library.
Sara Holmes Boutelle
Santa Cruz, California
Ms. Boutelle is preparing a biography of Julia Morgan. Ed.

One for the Gipper

Dear Sir: I gathered my family together and demanded they listen while I read them James A. Cox's article. During the reading my teenage sons' attitudes changed from bored resignation to raised eyebrows to grins, and to a final "Hey, thanks, Mom!"
Jacquelynne Lapitsky
Lemoyne, Pennsylvania

Dear Sir: George Gipp's brother was treasurer of the Presbyterian Mission at Fifth and Oregon in Philadelphia in the late 1920s when I was student pastor. He said there were many stories about how Rockne found George but that the following was the correct one:

Students used to watch football practice from benches along the sidelines. One day during punting practice an errant kick sailed over the crowd and dropped behind it. A minute later a perfect pass dropped into the arms of the punter. Rockne came running over, shouting, "Who threw that pass? Who threw that pass?" He was so excited he kicked over empty benches as he tried to jump them.

Gipp's brother also said it was untrue that George had not played football in high school. He was an excellent player, but did not enjoy it that much. His brother believed that all the variations on the theme must have come from George himself.
James L. Rohrbaugh
Seattle

Mall

Dear Sir: The life-size model of the jaw of *Carcharodon megalodon* contains 265 teeth, of which 49 are actual fossils; the rest are plastic casts, made by a team of model makers in the Smithsonian's Office of Exhibits Central, under the direction of the team of scientists that developed

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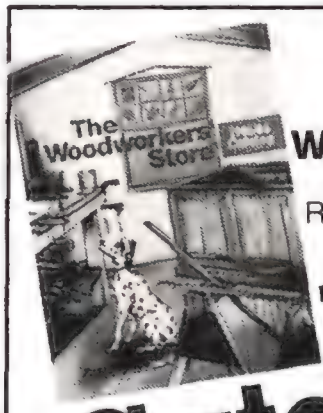

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the painted re-creation of the giant shark in Dinosaur Hall.

Walter Hock was the lead model maker. A veteran scuba diver who has seen sharks in their natural environment, he found this job not without hazard. He cut his arm on the teeth of a Great White shark being used as a reference tool. When installing *Carcharodon's* teeth, he scratched his head on one hard enough to draw blood. We then advised him to wear his scuba gear on the job.

Jim Mahoney
Director, Office of Exhibits Central
Smithsonian Institution

Dear Sir: Agate Pass is not a mountain pass but a narrow, navigable water passage connecting Port Orchard with the rest of Puget Sound. The Washington town of Agate was named, not for Alfred Taylor Agate, but for the beautiful agates found at Agate Beach, on the northern shore of the Olympic Peninsula. And there is no town of Agate in Oregon—just another Agate Beach, also named for its agates.

Mrs. F. T. Isaacson
Seattle

Not puns again!

Dear Sir: I'd cassowary eye on any host who didn't realize that toucan start raven and bust up the party.

Otto Haueisen
Nevada City, California

Dear Sir: As a young boy my uncle was addicted to punning, beyond the endurance of his father, who scolded him: "Charles, one more and I will have to punish you." Uncle Charles replied: "But Dad, that is not what punishment for."

Harriet Crane
Ferndale, California

Dear Sir: Richard Wolkomir encourages me to snipe at those who grouse at punsters. Widgeon you think your own family would allow you a pun or two? I often swallow their groans or take them with a crane of salt, but they can't shrike me out. I just duck their ruff reactions. As ani body knows, a good punster has to eider keep puffin along or go looney when people are robin him of his fun.

John R. Rizzo
Kalamazoo

Gifted Maritime Artist Raymond A. Massey Creates a stirring tribute To America's China Trade

Since the age of 11, Raymond A. Massey has devoted himself and his art to the glory of the sea and of sailing ships. His passion for the sea has led to a life of sailing, studying maritime history—and creating dramatic, detailed paintings which capture the majesty of the sea and sailing ships.

Massey's works span maritime history from 15th-century Europe to 20th-century America, and they hang in public, private and corporate collections nationwide, as well as major marine art exhibits and galleries.

Recently, Massey was paid the ultimate compliment by his peers of the American Society of Marine Artists with his election to the status of "Fellow,"—the highest artistic status that a marine artist can attain. Massey's works have multiplied both in renown and value such that originals from 1977 have quadrupled in price, and new paintings routinely sell for $8,000 to $10,000 and more.

With the introduction of his first ever plate painting, Raymond Massey has chosen yet another dimension for his celebrated maritime art. For his premiere in the limited-edition plate field, he has selected a most significant and historic theme: America's first adventures in the world of international commerce, which began 200 years ago with the China Trade.

A fact-finding trip to China and meticulous research prepared Massey for the creation of his "Empress of China" painting. He spent months reading the history of the China Trade, and perusing the old ships' logs and journals, trying to reconstruct the ship's appearance.

The result of his research is a masterwork that is historically accurate in every detail, capturing the triumphant "Empress" entering Whampoa Harbor. This limited edition also represents an art acquisition opportunity of lasting significance: as the premiere issue in the *Passage to China* Plate Collection.

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Massey's original "Empress of China" painting has been faithfully recreated on an impressive, 11-inch "canvas" of fine bone china using 16 separate ceramic colors. Encircling each plate is a decorative 24K gold border featuring an embossed, oriental motif that beautifully complements Massey's work.

This elegant issue is the first of eight plates in the *Passage to China* Collection. At two-month intervals, those who acquire "Empress of China" will obtain series rights and will acquire a landmark series featuring the ships of America's China Trade. Each issue will be limited to 15,000 for worldwide distribution, and each will be accompanied by a numbered Certificate of Authenticity.

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Because of the historical significance of this issue's China Trade Bicentennial theme, the fact that it marks Raymond Massey's collector plate premiere, and the excellence of the art and its presentation on fine bone china, collector demand for "Empress of China" is expected to be very heavy. Therefore, we cannot guarantee this offer after the final date shown in the Reservation Form. To avoid disappointment, order ***today!*** ©1985 HC

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Dear Sir: Kurt Stein, whose whimsical fables in German-English and English-German were Chicago favorites for years, occupied a regular seat at the authors' table in the Cliff Dwellers Club. One noon, to a man, we were all wearing tartan ties, so we went round the table identifying clans. Mine, Clan Rothesay, stopped them for a moment, but then someone said to Kurt, knowing he was Jewish, "What is *your* clan, Kurt?" The sober reply: "It must be Clandestine."
R. Milton Carleton
Sarasota

Dear Sir: No one likes to be branted not clever. I am no exception. But the concept of making bird puns is robin me of my sanity! I can barely hear my morning cereal go snap, grackle and pop. Perhaps I should have no egrets: if I ever got the hang of this punning, my family would have me ostrichized.
Bob Franklin
Albany, New York

Dear Sir: At my first college meal, when served an unidentifiable fish, I said to my neighbor: "This must be the piece of cod which passeth all understanding."
Leslie Finer
Washington, D.C.

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Around the Mall and beyond

Mannequins in 1775 garb demonstrate learned posture and deportment of times.

Fans of the National Museum of American History have been aware that something big and mysterious was taking place on the second floor. Entering the museum from the Mall, then turning right at the Foucault Pendulum, we ran into implacable blank walls and locked plywood doors. Some of our well-loved exhibits—the Delaware log house, the paneled room from the New England Bliss house—were hidden from view.

Well, around last Thanksgiving, the secret was unveiled. It's a new, permanent exhibition called "After the Revolution: Everyday Life in America, 1780-1800."

If the title daunts you, if the prospect of glimpsing three diverse families and three contrasting communities in our nation's infant years seems formidably academic to you, don't be put off. As a mossback history buff, taught to date kings, presidents and battles with accuracy, I found in this grand museum show how much I had been missing, including a new look at those favorite old displays.

On a chilly morning in early winter I marched into "After the Revolution," determined to get through it as quickly as possible and carry on with what seemed a more pressing assignment—lunch. I got no farther than the foyer before being stopped cold by an introductory slide show which informed me that in 1780 only about half of the white women in this country could sign their names, that in certain areas up to a third of them were pregnant when they married and that in 1790 the national public debt was a measly $42 million. The appeal of lunch faded as I continued into the small theater to be swept back into a very different America.

I met three families, the Saunders of Virginia, the Coltons of Massachusetts, finally the Springers of Delaware. I was just getting to know Thomas Springer, who farmed 129 acres in New Castle County, his wife Elizabeth and their daughters Mary and Anne, when the film ended. Then, with a neat bit of showmanship, the screen rose, revealing behind it the interior of the Springers' house. The audience simply got up and walked into it.

So involved was I by then that not until I had passed through this 18th-century home did I recognize that it was my old friend, the Delaware log house. For the first time it had become associated with actual lives. Thomas Springer worked hard and did well enough to afford four slaves, Will, Ace, Sara and Amelia, making enough money to invest in more land.

Elizabeth planted a garden, cooked meals, churned butter, spun yarn, took it to the weaver and made clothes. She reared the kids and kept the house clean. The children also had chores.

"The Springers weren't as poor as you'd think, judging by their house and their hard work. Many farmers found a good market in those days, and the Springers did pretty well." The speaker was Barbara Clark Smith, one of the museum curators who shaped the show. She has recently finished a book about the exhibit—*After the Revolution: The Smithsonian History of Everyday Life in the Eighteenth Century*—and I was fortunate to draw her as mentor on my second visit.

In every display, Barbara proved a rich lode for nuggets of added information. We looked at the interior of the Saunders plantation house in Isle of Wight County, Virginia. The small, simple room was arranged as though the family had just moved into it, with crates of belongings open for unpacking. "Henry Saunders wanted desperately to be a big-time planter like a Carter or Lee," said Barbara, "and he ended up with more than a thousand acres."

I glanced at the photograph of the house as it looks in Virginia. (The Smithsonian was given only the paneling and moldings from the parlor.) It's sturdy and well designed, but a long way from Carter's Grove, over near Williamsburg.

Samuel Colton of the Connecticut Valley built a splendid house in the village of Longmeadow, Massachusetts, in the 1750s. He distrusted democracy and thought the Revolution was nonsense. His store sold textiles and tools, rum and molasses, ceramics from England and such. His neighbors resented it when he raised some of his prices during the War for Independence, and they raided the place to restore honest values, giving Colton's goods to the town clerk to sell for prices they considered fair. "It wasn't vandalism," Barbara explained. "These were Yankees with the New England feeling that the community controlled the way you lived. They offered old Samuel the proceeds from the sale, but he didn't accept."

At age 32, Colton married a bride of 18 who was seven months pregnant—a condition that, says Barbara, met with some disapproval, but not shocked condemnation. The child died a few days after birth and his wife a few years later. His next wife, Lucy, had eight children, but only four survived past childhood.

Colton's formal front room left me a little bewildered. It's the room we museumgoers had always known as the Bliss parlor. New research indicated that the Smithsonian—and here I expect to be zapped by lightning—was wrong. The architecture was right for the Bliss house, the period and place were right, but the room's dimensions didn't fit new studies of the Bliss house's plans. The Colton house was dismantled at about the same time as the Bliss house and since the parlor's dimensions appear to fit in, it seems the most likely candidate.

This reassessment typifies what's been going on behind those closed doors at the Museum of American History. Gary Kulik, chairman of the museum's De-

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partment of Social and Cultural History, gave me some insight. "Computers were beginning to give us a chance to explore old documents faster and more fully than ever before," he told me. "Probate records, for example, contained inventories of household articles."

In incorporating and displaying these new findings, Gary, the curatorial staff and exhibit designer J. Michael Carrigan, under the caring eye of museum director Roger Kennedy, have managed to breathe real human life into these "period rooms." And that is what this new, remarkable exhibit is all about. Not the Washingtons or Jeffersons or Adamses, but ordinary Americans—the Springers, Saunders and Coltons. They don't typify the society of their time. They were just a part of it.

Of course American society was a lot more than a farm family, a plantation family and a merchant family. We see, through a few singular objects, the diverse culture that Black Americans, most of them slaves, managed to establish in an alien society—a gourd fiddle, for example, which illustrates a mingling of the white world with tenaciously held African memories.

We also realize the growing pressures whites were exerting on native Americans, who recognized that the white land hunger would destroy their tribes. At the same time they learned that whites valued beaver skins and liked to trade. Here we see, among such Seneca items as a cradleboard and corn-husk dolls, European goods acquired through trade.

The Philadelphia display gives us a charming change from no-nonsense farm life—a city surging with growth, humming with excitement. But even in this example of urbanity, the strangeness of early America persists. I tried "making a leg," flexing my calf muscle as men did back then to show off their legs to best advantage. All I did was give myself a cramp in the calf.

I struck one particular note of familiarity. In a school copybook, some delinquent student named, as I recall, Esther Copp, had been given a line to write—scores of times, it seemed: "Some people are busy yet do nothing."

"After the Revolution" is a tour de force for the Museum of American History, and opens the way to spin-offs and subsequent exhibitions. I foresee missing more lunches, and a good thing, too.

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Phenomena, comment and notes

Somebody must be out there. On all those worlds circling red suns, blue suns, double suns, giant suns, pulsing suns: somewhere somebody is. Modern science stretches our intuition to the breaking point, or turns it upside down and inside out, and yet intuition is not always wrong simply because it is intuition. And intuition tells us that in a universe of billions of galaxies, each with billions of suns, there must be somebody else. If life can arise once, surely it can arise more than once.

Life elsewhere can reasonably be expected to be older than ours. The Solar System we live in is only about 4.6 billion years old, a half or less than the age of the universe we see. The cosmos is filled with older stars that would have older planets on which life could have arisen much longer ago than on Earth. The possibilities make the mind ache as much as do the distances involved.

Imagine ourselves walking around in 986 and speculating on what the next 1,000 years would bring. Could anyone have guessed at how much the human mind would come to understand of biology? It would be another 900 years before we even knew how diseases are transmitted. Would we have happily assented to the idea that the Earth is not the center of the universe, or that there are other galaxies? Today we smile, but can any of us guess what we will know in another 1,000 years? Not to mention 10,000? My intuition fails. Yet if there are

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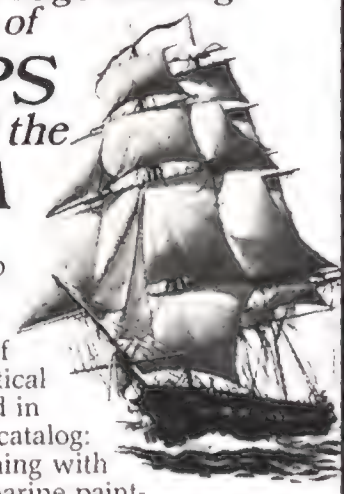

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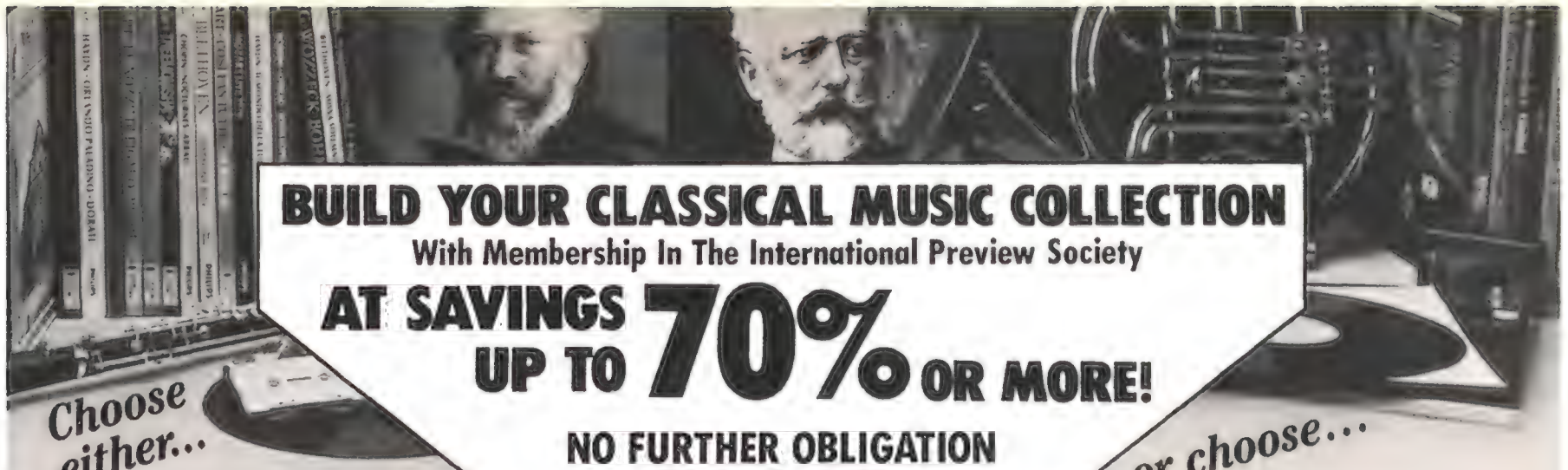

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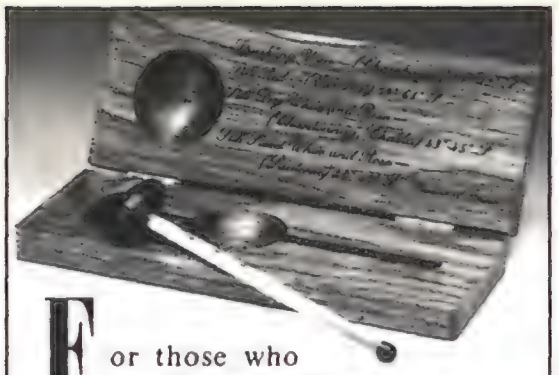

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other civilizations out there, they may be not ten thousand, but ten million years older than ours. And if such a civilization developed the equivalent of open-heart surgery, laser communications and space flight ten million years ago, what are they doing today?

As 1985 ended, scientists were looking back on a quarter century of looking for signs of such advanced civilizations with not a scintilla of evidence that any exist. During 120,000 hours of listening with the most sophisticated radio telescopes in seven different countries, we did not once hear "Breaker, breaker," strings of numbers, repeating patterns, any signals of any kind that stood out above the cosmic noise. For 25 years we have waited by the telephone and no one has called.

Astronomer Michael D. Papagiannis of Boston University recently reviewed the situation in *Nature*, the British science journal. He is president of Commission 51 of the International Astronomical Union: Search for Extraterrestrial Life. His vice presidents are N. S. Kardashev, a Russian, and Frank D. Drake, who in the spring of 1960 first turned a radio telescope to a nearby star to listen for the signals of intelligent life.

According to Papagiannis, we have found nothing so far but we are about to launch our most sophisticated effort yet and by about the year 2000 (let's make it 2001, in honor of Arthur C. Clarke) we will know a lot more about whether advanced civilizations abound in our galaxy. First Papagiannis reviews our most recent efforts, including some avenues that sound like they are straight out of

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science fiction. I had not realized that some have been searching with optical telescopes for artifacts, including automated probes, left in our Solar System by civilizations from elsewhere. They specifically looked at the stable points in the Earth-moon and Earth-sun gravitational systems, to see if we are being watched by a galactic equivalent of the television cameras stores use to keep an eye on us.

Astronomers in the United States and the Soviet Union have looked at stars that are unusually luminous at infrared wavelengths. They are looking for feats of astroengineering known as Dyson spheres, named for the Princeton physicist who first suggested them. To make a Dyson sphere, you simply dismantle all the planets around your star and reassemble the material in a hollow shell that envelops the star, catching large parts of its radiation (talk about an advanced civilization!). The trapped radiation would be reemitted out the far side of the shell at infrared wavelengths.

Papagiannis himself is gearing up for an infrared search closer to home. Using data from the Infrared Astronomy Satellite (*Phenomena*, November 1984), he is going to look for large artificial objects—things like space colonies and processing plants mining the raw materials in the asteroid belt—right here in our own Solar System.

Most of the search, however, goes on with radio telescopes. Some are directed at specific places in the sky: nearby stars similar to the sun have been a favorite from the first. But radio astronomers also check what Papagiannis calls magic places. The center of the galaxy, where stars are much closer together than they are in our neighborhood, way out in a spiral arm, seems an obvious place for a supercivilization and a pulsed beacon as a master navigational aid and communication channel.

Other searches swing across the entire sky. A radio telescope at Ohio State University has been searching much of the accessible sky since 1973, with some funding from NASA but dependent largely on the work of volunteers. Another whole-sky search, funded by the Planetary Society, has been conducted since March 1983 at the Oak Ridge Harvard-Smithsonian Observatory near Boston.

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generation of radios and signal detectors. Seeing how far we have come in just 25 years is exactly the kind of thing that makes me marvel at the thought of where we—or somebody else—will be in another 10,000 years. When Frank Drake first turned the Green Bank radio telescope toward the stars Epsilon Eridani and Tau Ceti that spring, he used a single-channel receiver. The new searches will be made with multichannel spectrum analyzers, instruments that can scan 8.4 million channels at the same time.

The new program is an all-California affair, centered at the NASA Ames Research Center, the Jet Propulsion Laboratory and Stanford University. Like previous efforts, it will be divided into a targeted search and an overall sky survey.

The targeted search will use large radio telescopes to look at 773 nearby stars of roughly the size and temperature of the sun, as well as some other stars with unusual spectra.

The sky survey will use smaller radio telescopes, examining something on the order of a million sections of the sky. The whole thing could be done in five years but realistically will take more like ten, Papagiannis estimates. So if we start around 1990, we will finish up just about at the turn of the century.

The search for extraterrestrial life has always been controversial. Scientists have argued that any advanced civilizations would have been here already. Since there are no signs that they have been here or are here, then they do not exist. Enrico Fermi put it simply a long time ago: "Where are they?"

The search is an old story (SMITHSONIAN, May 1978). It is tedious (imagine looking through the computer printouts of 120,000 hours of telescope time). And, as Papagiannis says, ". . . we began to realize that none of us can claim to know how civilizations far more advanced than ours are likely to behave and act."

The whole point is that we do not know that there is not a message. Intuition may be wrong, but we don't know for sure that nobody is out there. For the last 25 years, instead of just thinking about the question we have been doing something to answer it. We have moved from speculation to experiment. We are about to do a lot more. And wouldn't it be exciting if . . . ?

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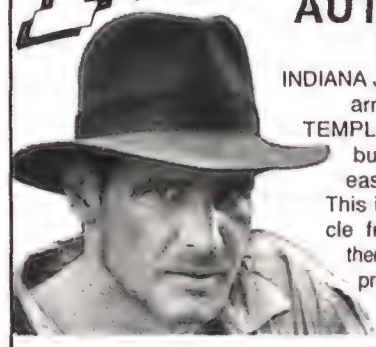

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By William Weber Johnson

The tumultuous life and times of the painter Diego Rivera

Weighing 300 pounds but catlike on a scaffold, he painted apocalyptic views of history and made his own contribution to it as well

Collection of Rafael Coronel

Portrait of Rivera's daughter Ruth, one of two he had with Lupe, was painted when she was 22, in 1949.

Almost 40 years ago I attended a birthday party for one of Mexico's "big three" mural painters, David Alfaro Siqueiros. His wife, Angélica, prepared a sumptuous paella and served it in their modest apartment at Calle de Paris No. 6 in Mexico City. The other guests were the remaining two of the big three—José Clemente Orozco, whom the press usually called *el maestro* (the master) and Diego Rivera, known as *el discutido* (the controversial or much-discussed). Siqueiros, a veteran of both the Mexican Revolution and the Spanish Civil War—and many a radical movement—was nicknamed *el coronelazo* (the big colonel). As a journalist working in Mexico, I knew all three. They knew about a great many things and had opinions on everything.

The three shared nationality, language, devotion to the oppressed and downtrodden, and commitment to painting, but they were alike in little else and at one time or another had been enemies.

Orozco, the eldest, drab in dress and dour in manner, was independent in thought and he spent an hour chiding his colleagues for wasting time on politics.

Siqueiros was debonair and dashing, as proud of being an activist and agitator as he was of being a boldly innovative painter. A stubborn Stalinist, he had

Even his friends and lovers called him frogface—affectionately. This is his self-portrait of 1949.

Detroit Institute of Arts

Edsel Ford, friend and defender of the revolutionary artist, was portrayed handsomely by Rivera in Detroit.

attempted to assassinate the fugitive Leon Trotsky, had spent years in exile, and not long after this gathering would be imprisoned for four years for his part in a labor uprising.

Rivera was the most complicated of the three. He was huge—six feet, 300 pounds—with small hands and feet, a large head and a face that wives and lovers likened to that of a frog. His clothes were always rumpled. He moved with the grace overweight people sometimes achieve. He had been the lover of many women, had mistreated most of them and, amazingly, had retained some degree of wry affection from almost all of them. In both painting and manner he could display a great gentleness, and in much of his painting there was a lyrical quality. He had a deep love for Mexico's Indians and great reverence for their pre-Hispanic past. But with these things he could alternate a propagandistic stridency. He had an astonishing grasp of history, both of his own nation and mankind, and never hesitated to distort it to suit his purpose. Rivera's politics were puzzling. The years of the Mexican Revolution he had spent in Europe, although he was later to claim for himself an active role in that struggle. He had been in the Communist Party, out, in again, out again, and at this particular time was trying to get back in again. He was a charming companion, a fascinating storyteller and a compulsive liar. The full and correct details of his life may never be known, thanks to the many untruths with which he salted the record. He more or less dictated five "autobiographies," none of which totally agrees with the others in every detail. But over and above his fabrications, his nonstop womanizing, his grotesque appearance, his eccentricities, his occasionally outrageous behavior, he was a thoroughly dedicated painter of great skill and phenomenal energy.

Rivera would have been 100 years old this year. The Detroit Institute of Arts is marking the occasion with a retrospective exhibition of his work—from February 12 to April 27—a show that will later travel to Philadelphia (June 2-August 10), Mexico City, Madrid and West Berlin. That this homage is being paid in Detroit would have pleased Rivera. It was for this museum that he did a series of 27 murals in 1932-33 that he called the "Age of Steel," celebrating, he said, machinery at the service of mankind.

Rivera had been fascinated with machinery since childhood. As a toddler he had a passion for taking toys and machines apart to see what made them work. In his native Guanajuato, where he lived until he was six, his earliest ambitions, he said, were to be an engineer and to be accepted by a group of local prostitutes. As it turned out, he said, he did not have his first love affair until the age of nine. By then the family had moved to Mexico City.

Engineering and sex were not the only areas of youthful preoccupation. Drawing and sketching were dominant interests at all times and he was admitted to the San Carlos Academy of Fine Arts when he was only 11. Among his instructors was Felix Parra, an academician who had an enthusiasm, rare among his colleagues, for pre-Hispanic Mexican art. This was to become a lifelong passion of Diego's. Another, José Velasco, was an accomplished landscape painter and a skillful teacher of perspective. And Santiago Rebull, who had been a pupil of Ingres, discerned something in the life studies of the fat young pupil in his class and privately encouraged him.

But the most important influence was not a teacher but José Guadalupe Posada, the engraver of cartoons illustrating events of the day: crimes, public outrages, political scandals, great curiosities. These, accompanied by doggerel verse, were printed on sheets of red, blue, green or purple tissue paper. The verses were sung by street musicians and the sheets were peddled in the streets for a centavo. Day after day the young Rivera would stand with his face pressed against Posada's shop (Orozco had earlier done the same thing) until finally the fat little engraver invited the fat little art student to come in for a chat about life and art. Years later Rivera would immortalize Posada in his *Dream of a Sunday Afternoon in the Alameda* mural in the Hotel del Prado in Mexico City (pp. 40-42). Posada is shown on the left arm of the central

William Weber Johnson is author of Heroic Mexico, *a history of the Mexican Revolution. He wrote about the epic conflict in* SMITHSONIAN, *July 1980.*

Museo Diego Rivera, Guanajuato

Pastoral early work of 1904, *La Era* is quieter, more conventional than his energized later murals.

Expelled from the San Carlos Academy, a young man about town, he had already become a fluent painter.

figure of a skeleton, while Rivera, as a boy in short pants, is on the right. (This and other Rivera murals suffered damage during the earthquake last September and the Mexican government is seeking contributions for restoration.)

At 16, the age at which he normally would just have been admitted to the academy, Rivera was expelled from it. He began roaming Mexico, sketching, painting, experimenting, teaching himself. He was encouraged by the veteran Mexican landscapist Gerardo Murillo (Dr. Atl), who insisted that young Rivera must go to Europe to find out what was going on. Rivera mounted a show in Mexico City with Murillo's help. The show sold out. Rivera, aged 20, embarked for Europe, arriving in January 1907.

He spent a year and a half in Spain. He closely studied Goya and El Greco. Three of his Goya composite study paintings, he claimed, later turned up in important collections, purported to be "originals."

He arrived in Paris in the spring of 1909, and began painting with renewed vigor. He enjoyed café life, went to the free art academies, exhibitions and galleries and developed a worshipful attitude toward Cézanne, Picasso and Henri Rousseau. He made painting excursions to Belgium, Brittany and London, had pangs of homesickness while looking at pre-Hispanic Mexican art in the British Museum.

In 1910, he rolled up his canvases for a trip back to Mexico, where he wanted to have an exhibition during the celebration of the centennial of Mexico's independence. His show in Mexico City was a success.

Soon he was back in Paris. For more than a decade it played an important role in his life, and in some ways he was more Parisian than Mexican. He painted industriously and eagerly followed current styles—Impressionism, Pointillism, Cubism. The last absorbed

Hotel del Prado, Mexico City

Above:
Dream of a Sunday Afternoon in the Alameda mixes Mexican history and personal memories. Rivera portrayed himself as a boy in short pants, to left of skeleton figure. On the right of ghoulish figure is José Guadalupe Posada, his mentor. At upper left, Benito Juárez holds constitution of 1857. Figure astride horse at upper right is Zapata.

Photographs by Dirk Bakker

his energies through 1913 and part of 1914. He found Cubism "very exciting," and it dominated his first one-man show in Paris at the Galerie Weill. He later reflected: "When it dawned on me that all this innovation had little to do with real life, I could surrender all the glory and acclaim Cubism had brought me for a way in art truer to my inmost feelings."

Before this apostasy occurred, however, he became friendly with Picasso; they admired each other's work.

He was also a friend and benefactor of Modigliani, far gone on drugs and alcohol. But he was most drawn to the Eastern Europeans, particularly the Russians. His two principal love affairs of the period were with Russian women. The first, an arrangement of ten years, was with Angelina Beloff, a slim, blue-eyed artist six years older than he. She bore him a son. The child died before he was two. The affair was interrupted for six months by another one with Marievna Vorobiev-Stebelska, whose daughter Marika was assumed by the art colony to be Rivera's child.

Rivera's growing dissatisfaction with his own work, plus conversations with the learned Dr. Elie Faure, the physician turned art historian, convinced him that fresco painting might be the solution. He went to Italy, spending a year and a half going from Naples and Pompeii to Rome, Milan, Ravenna, Venice and Constantinople, sketching everything he saw, copying

Fold Out

great wall paintings and making notes on the complex fresco process.

Meanwhile the Bolshevik revolution had excited him and turned his thoughts to the revolutionary upheaval in his own country while he had been away. Along with these thoughts came speculation as to how his art might further the aims of that struggle. This and news that his father was dying hastened a decision to go home.

A key figure in Mexico's post-revolution mural renaissance and in Rivera's role in it was José Vasconcelos, the brilliant young lawyer and philosopher who became minister of education. Part of the revolutionary period he had had to spend in exile, and he had spent long hours in the New York Public Library. Vasconcelos wanted to uplift his country with libraries, schools and universities, free editions of the classics and great mural paintings to inspire and instruct the

Overleaf: Automotive panel of the Detroit Institute of Arts mural shows Rivera's grasp of industrial power.

The Detroit Institute of Arts

Secretaría de Hacienda y Crédito Público, Mexico City

Painted in 1954, *The Studio of the Painter* is an outstanding surrealistic work. The model is unknown.

Hat maker Henry de Chatillon, a friend of Rivera's, posed for enigmatic portrait, *The Milliner*, in 1944.

Collection of Mr. and Mrs. Marcos Micha Levy

public. Rivera was among the first recruited for the mural program, but soon virtually every younger painter in Mexico City was working on a wall at low government wages. The first designated building was the preparatory school of the National University, an 18th-century structure. Rivera was to have one wall in the Bolívar amphitheater. Here, laboriously working in encaustic, Rivera did his first mural, a 1,000-square-foot version of the Creation.

Paint on wet plaster—dawn to dark

He then embarked on a far more ambitious project for the Ministry of Education. This he would do in the classic manner, painting on wet plaster. It included 124 separate paintings, or more than 17,000 square feet. While assistants prepared the wall and ground the colors, Rivera painted, a task that would keep him busy, usually from dawn until dark, for more than four years. While the quality is uneven, the twin themes of Mexico's labors and festivals constituted a tribute to both Rivera's creative vigor and the dynamic character of the Mexican mural movement.

This was followed by other large public commissions, including the Agricultural School at Chapingo and, most important, the National Palace. The latter was to occupy him for many years, his work being interrupted for other commissions and for travel.

Fundación Cultural Televisa, Mexico City

An early and adept Cubist at one time, Rivera painted *Portrait of Martín Luis Guzmán*, the novelist, 1915.

While Rivera's fame as a muralist was being shaped and his reputation climbing steadily, his love life was following an erratic course. As he was getting ready for the Preparatoria mural, one of his lovers, who wanted to extricate herself, brought him a new girl whom he soon married: Guadalupe (Lupe) Marín of Guadalajara. Rivera described her: "Strange, marvelous-looking . . . nearly six feet tall. . . . Black-haired . . . green eyes so transparent she seemed to be blind. Her face was an Indian's, the mouth with its full, powerful lips open, corners drooping like those of a tiger." It was a stormy match. Both of them were wild by nature and their battles were furious. They were frequently caused by Rivera's extramarital adventures, one with Guadalupe's younger sister, another with Tina Modotti, Edward Weston's photographer friend who occasionally modeled for Rivera. The Modotti affair caused such a storm that Guadalupe slashed what paintings she could find and threatened to shoot off Rivera's right arm with a pistol. Thus ended a marriage of seven years.

While painting at the Preparatoria, Rivera had frequently been heckled by 13-year-old Frida Kahlo. She was a brilliant student but a street-wise troublemaker who told her school friends she intended to have a baby by the fat man on the scaffold. Later Frida was badly injured in a bus accident, suffering spinal injuries, a triple fracture of the pelvis and a crushed foot. She spent a year encased in plaster and strapped to a board, able to move nothing but her hands. She took up painting and asked Rivera if he would look at her work. He was impressed—and captivated by the girl. In 1929 they were married. He was 42, she 19.

Frida Kahlo was an able and forthright critic whose judgment Rivera respected. She addressed him as Panzas (paunches) Carasapo (frogface) and the affectionate diminutive, Dieguito. She recognized that his art overruled everything else in her husband's life. In an article she wrote for an exhibition of his work she said, "I cannot speak of Diego as my husband because that term, when applied to him, is an absurdity. He never has been, nor will he ever be, anybody's husband." She suffered through his infidelities and engaged in a few herself. At one point they were divorced, but soon remarried. Her ambition to have his child ended in miscarriage. During much of their life together she was a virtual invalid, but one of great spirit. When four gunmen threatened the fat painter in a Mexico City restaurant, his tiny, crippled wife thrust herself in front of him and gave them such a tongue lashing in gutter language that the *pistoleros* retreated.

Rivera and Frida Kahlo married in 1929. An artist and bohemian in her own right, she died in 1954.

Quiet moment during a stormy marriage to Lupe, mother of two of his three daughters, is caught c. 1925.

Rivera, with Frida at his side, marches with union of writers and sculptors, Mexico City, about 1930.

Frida had successful one-man shows in New York and Paris, and her limited production of surreal-like paintings sold briskly. At an exhibition of her work at the Contemporary Art Gallery in Mexico City in April 1953, not long before the amputation of her gangrenous leg, she had to be brought to the opening in an ambulance. But this macabre circumstance was offset by her appearance: long, colorful Tehuana dress, ribbons braided in her hair, heavy, barbaric jewelry and on two of her teeth, diamond-studded gold caps. She died a little more than a year later. Not long after, Rivera married again. This time it was to Emma Hurtado, a magazine publisher who also had a gallery dealing in Rivera paintings.

Rivera's life with politics was almost as checkered as his life with the ladies. Soon after his return from France in 1921, he joined the Mexican Communist Party, holding card number 992. He became a member of the party's central committee and an editor of *El Machete*, the party organ. He poured as much energy into it as he did into his painting. His close friend, collaborator and later biographer, Bertram Wolfe, also a member of the party, urged him to drop it and devote all his resources to painting. He did, but shortly after Wolfe left Mexico he rejoined, in 1926. Late the next year he went to Moscow to help celebrate the tenth anniversary of the October Revolution. He thought he had a commission to paint a mural in the Red Army building. Nothing came of this. Instead he was ordered by the Comintern to return to Mexico. Home again, he found himself expelled from the party for accepting so many government commissions and becoming the director of the National School of Fine Arts. He continued to regard himself as a revolutionary and a Communist, repeatedly applied for readmission to the party and was finally readmitted near the end of his life.

The artist as renegade

There were many factors in the schism with the party. Perhaps the basic one was Rivera's volcanic individualism, his inability to work in harness or to accept any norms other than those imposed by his art. More tangible was his relationship with Leon Trotsky, the Communist exile. Rivera not only made it possible for Trotsky, hounded by the Stalinists, to enter Mexico as a refugee, but also made Frida Kahlo's old family home in Coyoacán available to him as a residence. For a time Rivera became loudly anti-Stalinist.

Perhaps equally pertinent was the increasing intimacy Rivera, the professed anticapitalist revolutionary, was enjoying with some of the big names in world capitalism. One of the early ones was Dwight Morrow, a Morgan partner appointed U.S. Ambassador to Mex-

ico. Morrow, a generous man, was trying to further U.S.-Mexican relations with good deeds. He persuaded Rivera to paint murals in the restored palace of Hernán Cortés, the Spanish conqueror, in Cuernavaca, the pleasant town that served as a subtropical retreat for Mexico City's wealthy. The subject: the history of the state of Morelos, in which Cuernavaca is situated, from before the Conquest until after the Revolution.

Rivera was easily persuaded. The subject embraced many of his favorite themes—the idyllic life of the pre-Hispanic Indians, the villainous Spaniards, the cruelty and suffering imposed on the Indians, hard labor in the cane fields, the heroic Zapata—and lots of tropical foliage. And the offered fee, $12,000, was more than he had ever been paid for a mural. He went to work with enthusiasm and, as he usually did, painted even more space than he had contracted to do. He abhorred an unpainted wall.

Soon other offers of Yankee dollars were pouring in on him and the Communist press was attacking him as an "agent of American imperialism." The first offers were in San Francisco where he did one mural for the Stock Exchange and another for the California School of Fine Arts. While in San Francisco Rivera met William R. Valentiner, director of the Detroit Institute of Arts, and confessed to him a fascination with industrial environments such as Detroit's. A seed was planted.

Next came a one-man show of his work at the Museum of Modern Art in New York. It was both a critical and popular success, with an attendance of 57,000. Meanwhile the Detroit Arts Commission, acting on Valentiner's suggestion, had invited Rivera to paint murals on subjects related to Detroit and its history in the garden court of the Detroit Institute of Arts. Edsel Ford was a leading figure in this and donated heavily to the project. He insisted that Rivera take plenty of time to tour and study all Detroit industry, not just automobiles and steel. This Rivera did with all the enthusiasm he had shown as a child taking his toys apart. In the process he became a friend and admirer of both Edsel Ford and his father, Henry.

When the Detroit panels (pp.43-45) were completed in March 1933, engineers inspecting them expressed amazement at the sophisticated selection of key elements and the fidelity of reproduction. Nonmechanical viewers were surprised at the way in which Rivera could make turbines, conveyor belts and stamping machines look sensual. There was a storm of criticism from conservatives. Father Charles Coughlin promi-

E. B. White pinned down the controversy over the Rivera RCA Building mural in this acerbic ballad.

I Paint What I See

E. B. White

"What do you paint, when you paint on a wall?"
  Said John D.'s grandson Nelson.
"Do you paint just anything there at all?
"Will there be any doves, or a tree in fall?
"Or a hunting scene, like an English hall?"

"I paint what I see," said Rivera.

"What are the colors you use when you paint?"
  Said John D.'s grandson Nelson.
"Do you use any red in the beard of a saint?
"If you do, is it terribly red, or faint?
"Do you use any blue? Is it Prussian?"

"I paint what I paint," said Rivera.

"Whose is that head that I see on my wall?"
  Said John D.'s grandson Nelson.
"Is it anyone's head whom we know, at all?
"A Rensselaer, or a Saltonstall?
"Is it Franklin D? Is it Mordaunt Hall?
"Or is it the head of a Russian?"

"I paint what I think," said Rivera.

"I paint what I paint, I paint what I see,
  "I paint what I think," said Rivera.
"And the thing that is dearest in life to me
"In a bourgeois hall is Integrity;
  "However . . .
"I'll take out a couple of people drinkin'
"And put in a picture of Abraham Lincoln;
"I could even give you McCormick's reaper
"And still not make my art much cheaper.
"But the head of Lenin has got to stay
"Or my friends will give me the bird today,
  "The bird, the bird, forever."

"It's not good taste in a man like me,"
  Said John D.'s grandson Nelson,
"To question an artist's integrity
"Or mention a practical thing like a fee,
"But I know what I like to a large degree,
  "Though art I hate to hamper;
"For twenty-one thousand conservative bucks
"You painted a radical. I say shucks,
  "I never could rent the offices—
  "The capitalistic offices.
"For this, as you know, is a public hall
"And people want doves, or a tree in fall,
"And though your art I dislike to hamper,
"I owe a *little* to God and Gramper,
  "And after all,
  "It's *my* wall . . ."

"We'll see if it is," said Rivera.

From *Poems & Sketches of E. B. White* (Harper & Row). © 1933, 1961 E. B. White.
Originally in *The New Yorker.*

nent among them, but Edsel Ford publicly defended the paintings and the artist, and peace was restored.

A larger controversy lay ahead. Rivera had agreed to do a mural in the new RCA Building in New York's Rockefeller Center. The theme was to be Man's choices for the future. Anyone who knew Rivera's work could have predicted that one element would almost certainly be peasants, workers and soldiers marching under a Red flag, and so it was. After a New York newspaper pointed out the irony of a Communist painter painting Communist subjects on a Rockefeller wall, Nelson Rockefeller became alarmed and asked Rivera to remove a face of Lenin from the mural. Rivera refused. He and his assistants were barred from the building and the unfinished mural was covered with canvas. Six months later it was destroyed, the plaster smashed.

Other mural commissions suddenly fell through. When the Riveras returned to Mexico they settled in their new home in San Angel, and somewhat later Rivera attempted to paint a replica of the RCA mural. And once more he resumed work on the stairway in the National Palace. He would finally finish it in November 1935, but would go on painting other panels in the palace until 1955, the whole series being known as "Mexico: Yesterday, Today and Tomorrow."

He was also doing more private mural commissions, such as the Insurgentes theater, Ciro's nightclub (in what he called his "saloon style," lots of naked women) and the dining room of the Hotel del Prado. Each in turn caused a scandal and public outcry, all of which Rivera loved. On a more personal, sentimental level he was building his own pre-Hispanic pyramid in the Pedregal, the vast lava bed to the south of the city, now a sleek suburb. It would serve as a studio, a home for the 40,000 or so pieces of pre-Hispanic art he had collected and would one day will to the nation, and his tomb (in fact, his ashes, on presidential orders, were placed in the Rotunda of Illustrious Men).

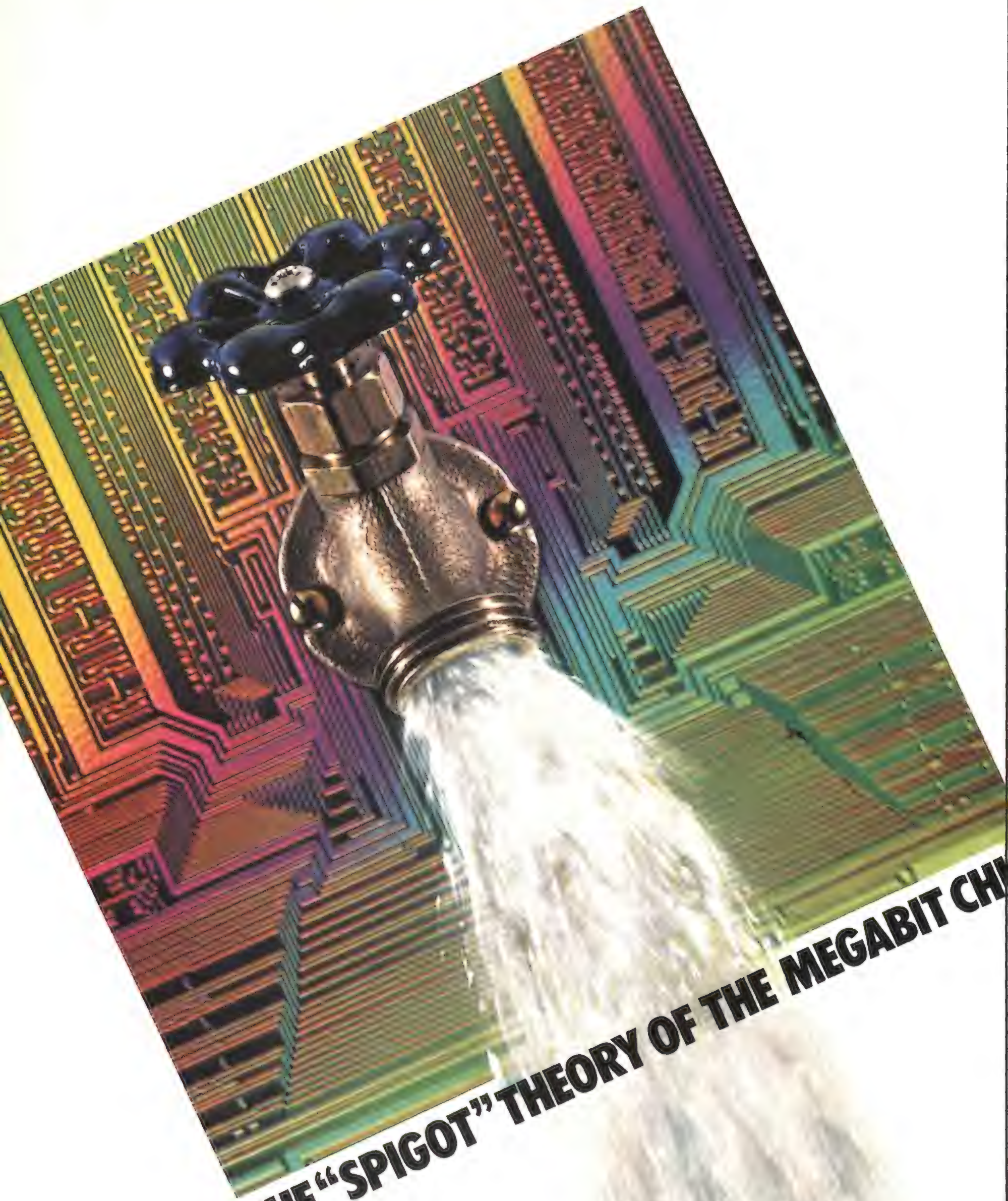
Just as Rivera's painted world was an imaginary one, so was his personality, a composition as complicated and contrived as anything he turned out in his Cubist period. Friends heard him say that he had experimented with cannibalism. They heard him tell and retell the same baroque adventure, now setting it in Paris, now in Oslo, now in Istanbul, now in the Fiji Islands. He liked to carry sidearms and wear cartridge belts, but no one could remember him firing a shot in anger. He loved political events, demonstrations and parades, but had little use for normal social occasions, although he could weather them with admirable grace. He enjoyed talking about his love life. If the current partner was famous, glamorous, rich or in the movies, so much the better, for in this case there was greater opportunity for erotic embroidery. Rivera would never stoop to the humble truth if a gaudy tale could be substituted, never deal in simple facts if a grand theory could be concocted.

What all these curious aspects of his character tend to conceal is that Rivera was a very serious man about only one thing in the world: his art. Into it he poured all his mental and physical resources, from childhood on. More than one critic described him as a prodigy of fecundity. He plunged into and mastered one style of painting after another until he found what he was looking for. Although masterful with sketch pad or at the easel, his greatest work, his greatest love, was on the walls. No one has yet calculated the number of acres or miles of wet plaster he converted to complex design, vibrant color and flowing movement.

Few contemporary painters have been as much written about, but most serious writers confess wishing they had comprehended and told more. Bertram Wolfe ends the second of his two massive and detailed biographies of his friend with "Notes for a Future Biographer," apparently admitting dissatisfaction. And these notes he closes with some words of Frida Kahlo, the one person in the world who came closest to understanding Rivera: "No words can describe the immense tenderness of Diego for the things that had beauty. . . . He especially loves the Indians . . . for their elegance, their beauty, and because they are the living flower of the cultural tradition of America. He loves children, all animals . . . and birds, plants and stones. His diversion is his work. . . . His capacity for work breaks clocks and calendars. . . . He tries to do and has done what he considers just in life: to work and create. . . ."

Rivera's fiery liaison with Lupe lasted seven years. He did this portrait in 1938, after the breakup.

Museo de Arte Moderno, Mexico City



THE "SPIGOT" THEORY OF THE MEGABIT CH

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The "Trickle-Down" Theory Vs. The "Spigot" Theory

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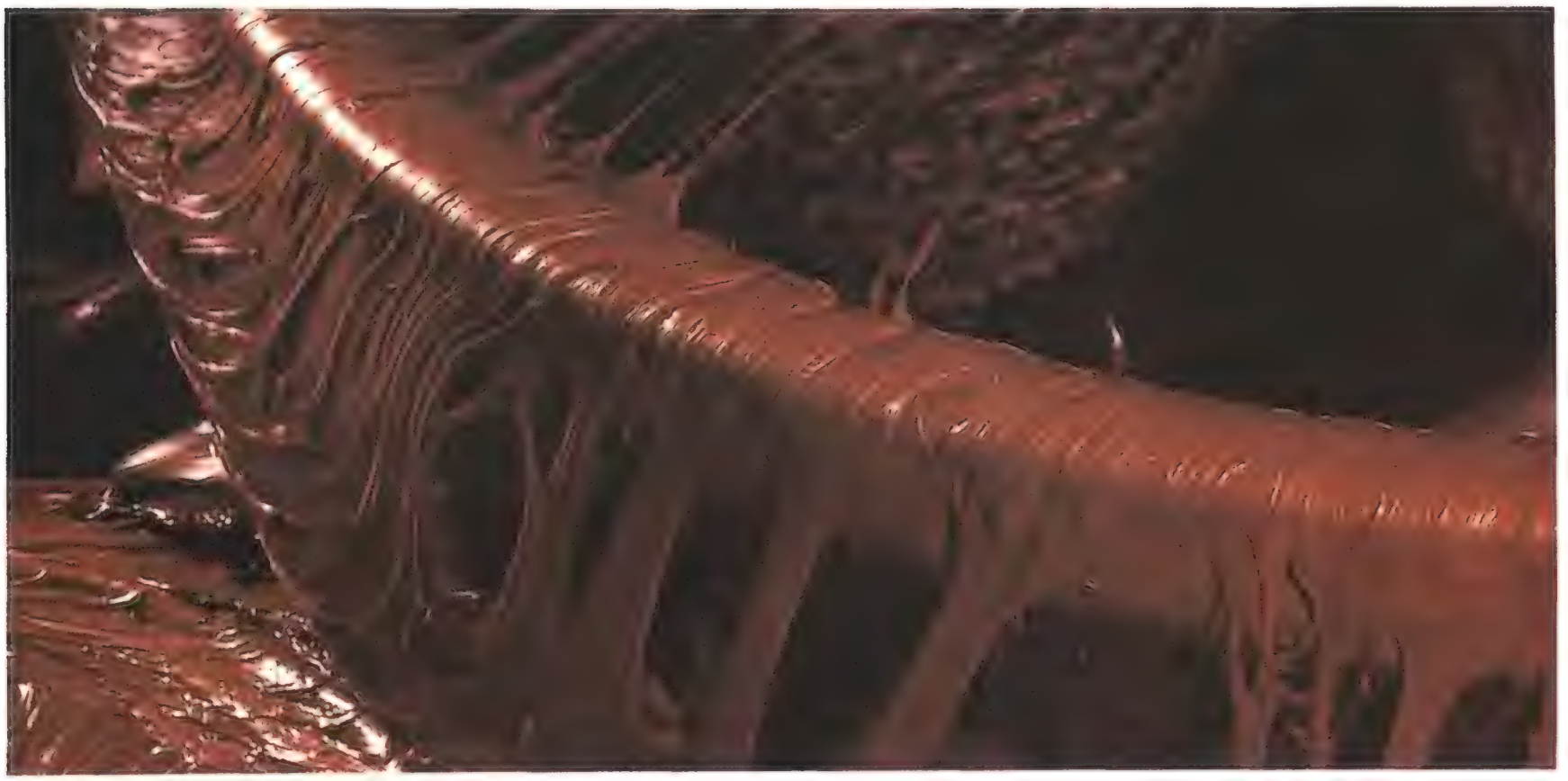
By Ruth Mehrtens Galvin

Sybaritic to some, sinful to others, but how sweet it is!

Choose up sides and thank the Maya, Cortés, Samuel Pepys, du Barry—but mostly those 20th-century chocolatiers, all vying to please



On the way to becoming chocoholics' delight, flaky, fine chocolate and cocoa butter are stirred and rolled over and over during conching at Ghirardelli's. Warm, silky-smooth, it is then ready for processing.

She was magnificent: ten feet tall, 2,200 pounds and all chocolate. Germania, proud symbol of the Stollwerck company, ensconced in a 38-foot Renaissance temple (chocolate, of course), was only one exhibit at the Chicago World's Columbian Exposition of 1893. Van Houten had so much to show off it put up a whole "chocolate house," the stucco reproduction of a 16th-century Dutch town hall. In 1894 the chocolate house was moved to Massachusetts where, painted pink, it is presently the happy home of a psychoanalyst.

Yes, sir (and madam), if you think now is the heyday of chocolate, you might take a look at the ephemera of chocolate lovers at the turn of the century. That was when Henry Maillard ("Importers of Fancy Boxes and Easter Eggs") was giving free chocolate-cooking classes at 114 West 25th Street in New York; when Hawley & Hoops ("Makers of Shaped Chocolates") were putting out "A No.1." bears and rabbits, lobsters and pigs, cigars and pipes—even chocolate violins; when you could send away to Huyler's and receive a set of picture-cards with a poem for every day in the week ("For breakfast on the day of rest/ We always get what we like best: Huyler's Cocoa" and "Monday is my washing day/ A

A dizzying array of Victorian *Theobroma cacao* ephemera shows insouciant youths, sweet little girls.

Photographs by Liane Enkelis

Chocolate—sybaritic or sinful?

Larger-than-life reliefs of emperors, other German bigwigs enhanced Germania's solid chocolate pedestal.

cup of Huyler's makes work play/ Pure! Delicious! Healthful!").

All chocolate in those days was said to be pure (and certainly healthful) but Bell's Chocolates, "dipped with a fork," were both "clean *and* pure." A brochure exhibited a photograph of tastefully attired ladies wielding their forks, as well as a picture of several rather gooey-looking young women doing something else: "In the usual method of dipping," said the ad, "the HAND is continually IMMERSED in the CHOCOLATE & the creams are DIPPED with the FINGERS." Well!

I found all this, and much more, in the Wilbraham, Massachusetts, headquarters of a young man named William Frost Mobley, a chocolate fancier who maintains a business in antiquarian ephemera, dealing in the bits and pieces of everyday life that recall people's pleasures for posterity. He avers that his comely, dark-haired wife, Emily, also makes the best chocolate cake in the world, from a recipe in the box of a French product called Poulain. The afternoon I was in Wilbraham, Emily gave me a cup of Poulain cocoa. "It'll knock your sox off," she said. It did.

Small batches and the best ingredients

The Mobleys' was only one of my stops on a six-month trek that began out of utter astonishment at the continuing craze for chocolate. I had grown up in the simple era when life progressed predictably from Baker's cocoa on frosty evenings to Hershey's Kisses and Nonpareils on holidays, frozen Mars bars to take one through teenage summers and, true love at last, a Whitman's Sampler. I "knew" chocolate was vaguely naughty because it "spoiled" my meals, my teeth and my skin. I dreamed of the day my mother would let me have her collection of tiny, hand-painted cocoa cups, favors from birthday parties in her girlhood Brooklyn. As I grew older, I moved snobbishly from milk chocolate to dark, from commercial to "handmade." Given Godiva by one of those nouveau New Yorkers who follow every fad, I thought the affectation was vaguely silly until I realized that I, too, was seeking out handmade chocolates in capitals around the world. After I found some of the best only a stone's throw from my own Boston apartment, I learned my first lesson about what makes good chocolate: small batches, carefully made, without preservatives, from the very best ingredients. High price and a famous name guarantee nothing.

When suddenly I felt surrounded by self-styled chocoholics, chocolate portraits, chocolate perfume and chocolate cruises on the *QE2*, it seemed time to call a halt and ask what the fuss is all about. To get some answers, I drove out to my favorite local chocolate supplier, a pristine little red-and-white converted

factory known as Harbor Sweets, down by the Salem, Massachusetts, waterfront. There, women of all ages, education and background—the mayor's wife and the fire chief's, college graduates and the retarded, members of the Eastern Yacht Club, Finns, Dominicans and Vietnamese—work four-hour shifts under the motto, "Love is a quality controller." Stirring caramel in a shining copper cauldron or leaping at the sound of a bell to put pecans on the caramel drops when they have reached just the right temperature; keeping an eye on the vats of chocolate "liquor" to get them to a careful 89 degrees; painting white sails on the "Sweet Sloops" (chocolate-coated buttercrunch) as they emerge along the assembly line; wrapping or packing Marblehead Mints, Sweet Shells, Sand Dollars and Barque Sarah into a Valentine heart, they make up a small ($1.5 million in sales) company, a cross between your neighborhood candy man and the big fellas.

In an informal taste test of gourmet candies by experts on one David Susskind TV show, Harbor Sweets won, hands down. To consumers, it is not only fine but one of the most expensive chocolates made in America (30 Sweet Sloops for $15). To other manufacturers, proprietor Benneville Strohecker is best known as a great marketer. Grandson of the man who made the first chocolate bunny in the United States—in Reading, Pennsylvania—he had been an executive with Schrafft's before he left to start his own company. He now turns out special chocolates for Gump's of San Francisco, the Boston Symphony Orchestra, Chicago's Field Museum, the Carnegie Museum in Pittsburgh, even the Smithsonian (from copies of old molds in the Institution's collection). What other people see as expensive, Ben Strohecker insists is really an *in*expensive gift because "Chocolate makes everybody smile—even bankers."

Armed with Strohecker's "chocolate" library, I discovered that chocolate has been making Americans smile for 4,000 years. A Mayan treasure grown and used by the Aztecs for centuries before the Spanish discovered it in Mexico, chocolate was believed to have been brought down from the Garden of Life by the great god Quetzalcoatl as consolation to Man for having to live on Earth. In the afterlife, it was expected to be served perpetually.

On his fourth trip to America, Columbus found some cocoa beans in a canoe off Yucatán and picked them up as a curiosity. Hernán Cortés, discovering that cocoa beans were used in Mexico as currency, had the tree cultivated in earnest. Exacted as tribute by Montezuma, the beans were literally money in the bank. Ten could buy a rabbit; 100 a slave. Cortés sent home the recipe for a curious drink the Mexicans consumed, called *chocolatl.* Montezuma swilled it down, golden goblet after golden goblet. Mixed with water, maize and spices, the ground cocoa beans were considered an aphrodisiac, served with ceremony at weddings and said to be permitted only to the aristocracy. Chocolate had social cachet. In Chiapas, following the establishment of Catholicism, grand ladies had their maids bring them the drink in church until the bishop, annoyed, forbade the practice. One of his parishioners, so the tale goes, "somewhat too familiar with one of the Bishop's pages," got him to serve the prelate a nice cup of *chocolatl.* It killed him. The lady in question told explorer Thomas Gage that practically nobody missed the bishop.

Cocoa reached Europe before either tea or coffee, gradually moving from Spain and Portugal to Italy, Austria, France and then over to the British Isles, where a high import tax kept it special. By 1664, diarist Samuel Pepys admitted to drinking it. After a 17th-century cardinal ruled that liquids do not break a fast, cocoa became a Lenten fad. As an "inflamer of passions" it was also said to tempt monks to break their

Bill and Emily Mobley go for broke with her "knock-your-sox-off" cocoa and special chocolate cupcakes.

A journalist specializing in behavior and a veteran chocolate eater, Mrs. Galvin wrote about lucid dreaming in the August 1983 issue of SMITHSONIAN.

Droplets of liquid chocolate drizzling from machine onto a steel belt form Ghirardelli's sinuous chips.

At Harbor Sweets, operator guides fluid Sweet Shells into reproduction of antique shell and animal molds.

vows, and its use by Madame du Barry and Casanova did little to dim that reputation.

In 1753 the Swedish botanist Linnaeus gave the cocoa plant its scientific name, *Theobroma cacao*—the food of the gods. (The tree is cacao, the bean is cocoa and the food is chocolate. It bears no relation to either coconuts or coca, the source of cocaine.)

Most cacao is grown between 100 and 1,000 feet above sea level and within ten degrees of the equator. In the late 19th century, the Portuguese took *Theobroma cacao* to some islands off Africa, and it soon became an established crop in the Gold Coast, Cameroon and Nigeria, where the temperature and humidity are ideal for it. Russell Cook, an authority on the subject, cautioned, in his definitive *Chocolate Production and Use*: "Regardless of species or variety, *Theobroma cacao* is a virtual prima donna in its requirements for healthy growth." A young cacao tree cannot grow in full tropical sun. It is cultivated with such trees as banana and rubber, which provide shade and alternate sources of income should the cacao crop be wiped out by fungi, pests or climatic problems.

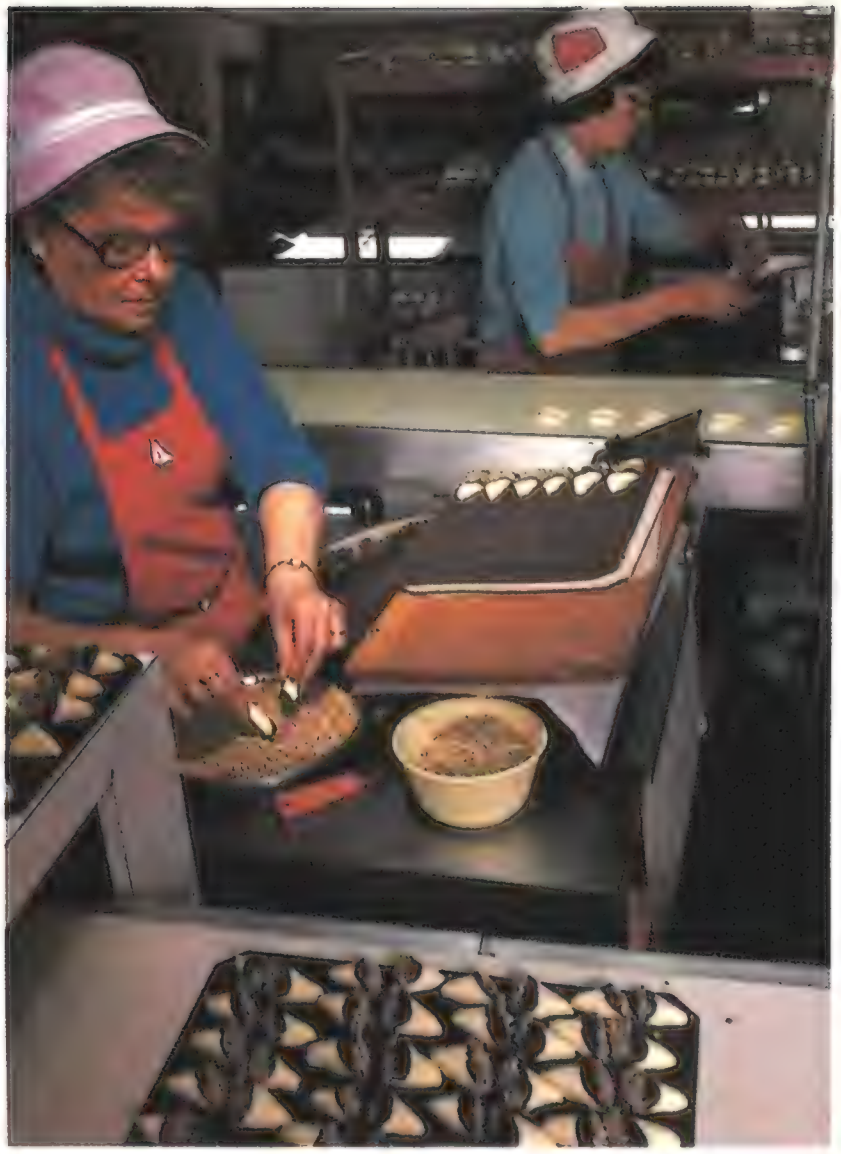
It had become clear to me that there is more to a chocolate bar than meets the eye. One afternoon I turned on the public radio program "All Things Considered" and heard about a botany course on chocolate being given by Prof. John West at the University of California, Berkeley. I wrote to him. He wrote to me. We talked on the telephone. Soon, there I was on his doorstep.

Botanist West, 46, made his reputation as a specialist in marine algae, but his hobby is making desserts. Through that he got interested in chocolate and, naturally, its botany and biochemistry. For the past four years he has been pursuing everything he can find out about chocolate, and he now offers a course labeled Botany 117, better known as "Chocolate." "It's a hell of a lot of work," says West. He admitted only 55 of the first 800 students who flocked to sign up (15 dropped the course when they realized he was serious).

John West looks at chocolate as a scientist. Among the myths he views with a fishy eye is the one devised a couple of years ago by several psychoanalysts, that lovelorn women binge on chocolate because it is a source of phenylethylamine, "the chemical released in the brain when people become infatuated or fall in love." There is more phenylethylamine in sauerkraut, West points out, with some disgust.

An Idaho farm boy deeply concerned about the difficulties of growing cacao—and how little the farmers themselves get from a crop that makes so many other folks rich—John West pointed out to me that while many other plants in the tropical forest have developed good defenses against disease, the cacao has not, nor have its cultivators succeeded in breeding pest-resistant strains. Fungi cause the most trouble, the

Belt moves on through refrigerated tunnel to solidify them. Process can handle up to 4,000 pounds an hour.



Toothsome blend of dark and white chocolate with buttercrunch gets dusting of nuts at Harbor Sweets.

major one worldwide being black pod disease, a relative of the fungus that created the Irish potato famine. Then, there is an insect aficionado for virtually every part of the cacao tree. The worst, capsids, use a stylet like a hypodermic syringe to suck fluid from the plants.

"I'm very keen on biocontrol," West remarked. Marine algae, he explained, must develop many natural toxins to keep from being gobbled up by every animal in the sea. There, compounds are called phytoalexins (flowering plants use them to discourage grazing and attack by fungi and bacteria) and could be extracted and put to use as substitutes for commercial pesticides and fungicides. The major cacao-producing nations have not only endless problems growing the plant, but also have oceans of seaweed right off their shores. Why not, asks West, use seaweed to solve some of the disease and pest problems of cacao?

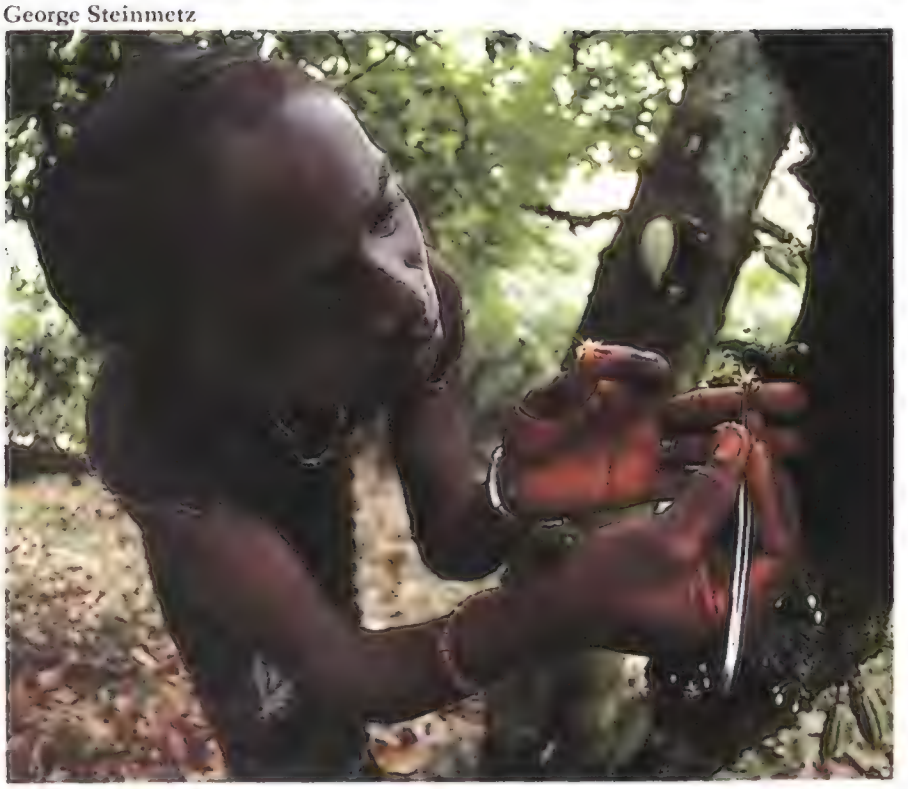
Almost all chocolate today comes from the seeds of one or another type of the Forastero variety, a hardier breed than the Criollo, from which the legendary *chocolatl* was made. Once planted, a bean will start to grow in less than two weeks, and in another two or three will show primary leaves that look like tiny wings. Depending on shade and humidity, the tree can grow as high as 40 feet; most are only 20 to 25. Evergreen, with large, elliptical, shiny leaves, it will not bear fruit for three or four years. By age 50 it is over the hill.

A pastel beauty like a tiny jack-in-the-box, the flower can be white or rosy, pink or yellow, bright red, or any combination. It grows directly on dense "cushions" on the bark of the tree by the tens of thousands—as many as 6,000 per tree per year. Few of these marvelous flowers are ever pollinated (it was not known until 1940 that the deed is done not by birds and bees but by a tiny insect, a midge). The average tree bears annually no more than 30 pods about half the size of a football, containing between 20 and 40 seeds each—our future chocolate. Good fertilizer is essential, says John West. Harvesting, twice a year, requires skill lest the machete nick the cushion, destroying tissue needed to grow new flowers.

When the pods are cracked open, almond-shaped beans are freed from their acidic membrane, piled high and covered with banana leaves or palm fronds. Taken from the placenta and separated, the beans are still covered with pulp, something important to fermentation, the next essential process. Without fermentation, chocolate will never taste right. Philip Keeney, at the Food Science Department of Pennsylvania State University, told me it creates chocolate's "flavor precursors" by breaking down the sugar to glucose and fructose, and turning some of the protein into free amino acids and smaller peptides.

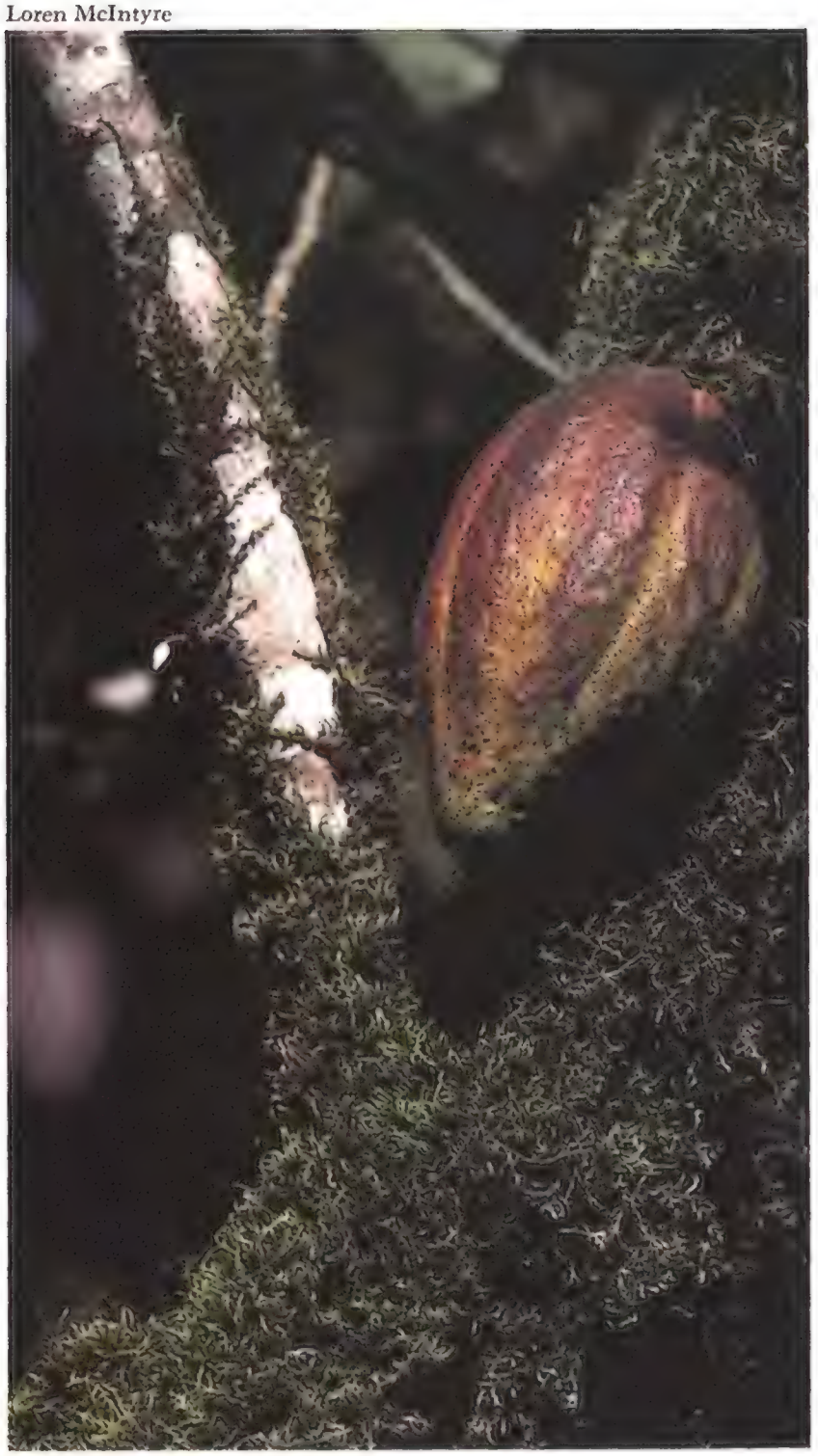
The science of fermentation pursued to perfection can create delicious varieties of cocoa beans that com-

George Steinmetz



Tiny cacao blossom at right is hand-pollinated from detached blossom (left) in hybridization experiment.

Loren McIntyre



Great care must be exercised in harvesting mature cacao pod to avoid damage to the flower cushion.

mand premium prices. The skillful farmer will gather neither overripe pods, whose beans will not have enough flavor, nor underripe ones that tend to have a "hammy" taste. A cocoa-bean connoisseur learns to beware of gray or purple beans (signs of too little—or no—fermentation) or overfermented ones whose deep brown color is a sign of rot. Once fermented, the beans must be dried before being packed for shipment. A great agricultural gamble, cacao is also a potentially great source of income for any country that can grow a lot. In this century the chief producers have been the Ivory Coast, Brazil and Ghana, plus Nigeria and Cameroon. Thanks to its large population and prosperity, the United States is the number one purchaser, buying 11 percent (460 million pounds) of the world's cocoa beans. Per capita, though, the Swiss, Austrians, Belgians and half a dozen other countries all consume more chocolate than do we.

Cocoa beans were once a wild speculation as those who could bought up supplies, holding them to create false shortages and high prices, then dumping them on the market with a subsequent price "bust." Such a collapse just after World War I caused the creation of the New York Cocoa Exchange (now merged with the much older Coffee and Sugar Exchange), the commodities market on which cocoa futures contracts are traded in units of ten metric tons (22,000 pounds) for delivery up to 12 months in the future.

When I visited the Exchange at the World Trade Center in New York, I learned that it doesn't take a college degree to trade in cocoa-bean futures, just experience, and that the strenuous commodities market

Stan Blossom, Sun Company district engineer, with his son, Tony, fishing near Hillhouse oil rig in the Santa Barbara Channel.

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is a young persons' game. Around the cocoa pit—an octagonal fence—cocoa-bean contracts are traded by "open outcry": everyone just yells, with a few hand signals thrown in. The cocoa market is what Bennett Corn, president of the Exchange, cheerfully calls "organized chaos." Behind the pit the youngest apprentices, some looking scarcely out of high school, man rows of telephones to take orders and transmit them to the pit where by 9 A.M. traders are two and three deep. Employees of the Exchange sit on a platform, ready to record the agreements made. At 9:30, with the ringing of a bell, mayhem breaks loose. Those with contracts to sell shout their offers of delivery date, numbers of contracts and price, hoping some buyers will accept. Suddenly all shouting stops. Deals have been made. The going price appears in the middle of the pit on a television screen topped by a digital clock and is recorded on the huge wall board high above. Just as suddenly, the trading begins again. "September!" shouts a young man in a red sweater, to nobody in particular. They are back at it again.

More than 600,000 contracts were traded in New York alone last year. Speculators hope the contracts they buy and sell at one price will be worth far more by delivery time. Manufacturers join the fray not so much to speculate as to hedge, buying and selling at different times in an effort to secure prices.

John West describes branching pattern and leaf shape of young cacao tree to his students at Berkeley.

Special blends, utmost secrecy

The actual beans destined for chocolate are chosen carefully from shipments delivered, for the most part, to the Port of Philadelphia. Each manufacturer has his own special blends, whose secrets he guards with his life. The Aztecs ground cacao beans in small bowls hollowed out of lava and mixed the granules with spices to produce a bitter brew; the Spanish added sugar. In the centuries since, other countries have made their own contributions. C. J. van Houten of Holland, concerned about fat, pressed the cocoa butter out of chocolate and added alkali to the remaining powder to produce a different color and taste known since, not surprisingly, as "Dutch." The cocoa butter van Houten did not want began to be added to a fluid called chocolate liquor to make chocolate. It was the Swiss who added milk, creating the most popular type.

The first North American chocolate was manufactured in 1765 in the corner of a factory at Dorchester Lower Mills on the outskirts of Boston by John Hannon, an Irish immigrant. When Hannon disappeared, his backer took over and named the company for his own grandson, Walter Baker. America's most famous chocolate man was a Pennsylvania Dutchman named Milton Hershey, who went broke repeatedly before making his first million. Today, Hershey Foods is the foremost researcher in the chemistry of the cocoa bean, using its findings to start an experimental cacao tree farm in Belize. The Mars family, now in its third generation in the candy business, makes the most popular candy bar in this country, Snickers. M&M's rank second. Third is Reese's peanut butter cup, made by Hershey.

As chocolate has become big business, so too has the machinery, much of it made in Germany and Italy. To get a glimpse of it, I headed for San Leandro, California, home of the Ghirardelli Chocolate Company. One of the smaller manufacturers but perhaps as diversified as any, Ghirardelli has a typical history of immigrant enterprise, true grit and hard times.

Once Domingo Ghirardelli was the largest chocolate manufacturer in the western United States. He came into the world in Rapallo, Italy, in 1818, nearly 50 years before Milton Hershey was born in Pennsylvania. Apprenticed to a candy maker, he and his bride eventually reached the United States by way of Uruguay and Peru. When he sent 600 pounds of his chocolate north to San Francisco with a neighboring merchant headed for the Gold Rush, it was such a hit that Domingo swiftly followed. At first successful as a merchant and shipper, financial reverses sent him back to making chocolate, and his family owned the business for the next 110 years. In 1962 it was sold to another Italian family, the DeDomenicos, makers of Rice-a-Roni, who moved it to San Leandro. There, the director of quality control, Ned Russell, took me through the plant.

Making chocolate is not as simple as grinding a bag

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Eight-year-old Alex Heaslett of Palo Alto steals a march on his birthday by getting to lick the bowl.

of beans. The machinery in a chocolate factory towers over you, rumbling and whirring. A huge cleaner first blows the beans away from their accompanying debris —sticks and stones, coins and even bullets can fall among cocoa beans being bagged. Then they go into another machine for roasting. Next comes separation in a winnower, shells sliding out one side, beans falling from the other. Grinding follows, resulting in chocolate liquor. Fermentation, roasting and "conching" all influence the flavor of chocolate.

Chocolate is "conched"—rolled over and over against itself like pebbles in the sea—in enormous circular machines named conches for the shells they once resembled. Climbing a flight of steps to peer into this huge, slow-moving glacier, I was expecting something like molten mud, but found myself forced to conclude it resembled nothing so much as chocolate.

Ghirardelli makes its own chocolate as well as special blends for other firms, as does Nabisco, the huge candy and cookie company that custom-makes "Merckens Bordeaux" for Harbor Sweets. ("Handmade" chocolate, Ben Strohecker had informed me, is handmade only at the end.) Ghirardelli also specializes in cocoa, which comes out of a press in wheels like small brown manhole covers. The extracted cocoa butter is added to the liquor reserved for making edible chocolate. Cocoa butter determines how fluid the chocolate feels on your tongue; texture also comes from refining and conching.

Manufacturers have tried for years to make chocolate synthetically, with little success, because chocolate contains hundreds of substances and no one knows which are responsible for its distinctive flavor. Forty or 50 separate compounds are crucial to the taste, John West told his class the week that I was there. After a rapid-fire introduction to flavor chemistry, the students were provided with cotton swabs and rows of tiny paper cups containing various strengths of sucrose, acetic acid, saccharin, hydrochloric, propionic and citric acid, and set out to discover just where on their tongues they appreciated each substance and what it tasted like. "I'm not training them to be professional flavorists," West explained to me, "just to perceive the basis for what they are doing when they taste chocolate." When I got back to Berkeley from San Leandro the whole ground floor of the Life Sciences Building reeked with the odors of several dozen chocolate components with which West had anointed thin strips of balsa for a "sniffing exercise.

As I left Botany 117, the class had still to tackle the toxicity of chocolate, a subject much studied in animals but not so much in people. The major concern about chocolate is theobromine, often suspected of being a problem because its molecular structure so resembles caffeine's. What caffeine is to coffee and theophylline is to tea, theobromine is to chocolate. With his staff of more than 150, Barry Zoumas, vice president of science and technology for Hershey, has studied the chemistry of theobromine for a dozen years. Chocolate would have to be virtually your entire diet, he told me, for the theobromine in it to do you any harm.

Scientists have long since proved to their own satisfaction that chocolate does not cause acne and that almost nobody is allergic to it. Studies have even shown that the cocoa bean may have properties that protect teeth from plaque formation. "There is always the sugar, you know," my dentist reminded me with a smile (even dentists smile when you say "chocolate").

With the price of cocoa beans going up, I did one last thing when I left the Cocoa Exchange. I stopped downstairs to visit what I presumed would be a friendly banker. "Can I borrow some money to speculate on the cocoa market?" I asked. "Sixteen percent, $10,000 limit," he declared, barely glancing in my direction. Without the glimmer of a smile.

From bean to binge: a cascade of dried beans flows around open cacao pod and into a pool of chocolates.

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The defensive huddle of muskoxen protects them from wolf attack but was inadequate barrier against guns.

By Charles Bergman

A brave return from the brink for an Ice Age relic

Killed off by the thousands by human hunters, muskoxen were nearly extinct 50 years ago; now protected, their population is booming

The yearling cut from the herd and scampered across the pack ice over the Bering Sea. Leaving it behind, the 30 other muskoxen kept up their steady shuffle across the dunes, the wind blowing their long hair. Sitting under a glaring sun on Nunivak Island, a remote and roadless wilderness off the west coast of Alaska, we lost sight of the yearling as it began to gallop, confused and alone, through the crushed and tilted angles of the shoreline ice.

Our two Eskimo guides, Ed Shavings and Tom Amos, looked worried. No one knows for sure why some muskoxen on the island move onto the sea ice in late spring, but it seems to be common. "This is not good ice for the baby," Ed said. We scrambled down the bank onto the ice and fanned out to look for the yearling's tracks. Ed found them and followed them toward the edge of the pack ice. The spring breakup was beginning and we could hear the ice cracking as we sprinted right behind it. Panicked, it had charged headlong off the ice into the sea. When we arrived it was half-submerged in slush and bleating helplessly.

Only half a century ago, the future looked as desper-

Muskox's rump is called by writer Peter Matthiessen the most "endearing" of any except the elephant's.

ate for the entire species as it seemed for this little yearling. Overhunting had left the muskox extinct in Alaska and threatened on the mainland of Canada. Even in Greenland and the high Arctic islands of Canada, where the austere remoteness offered some large measure of protection, modern hunting methods had left the numbers of muskoxen so low that biologists were seriously worried about total extinction of the species. Yet the muskox is now a major success story in wildlife conservation and management. Protected from hunting, the Canadian muskox is on the rebound. Introduced on Nunivak Island during the 1930s, muskoxen have since been transplanted successfully to four additional areas within Alaska. There and in Canada, its numbers are climbing briskly. Limited hunting for muskoxen in some areas has even been allowed. Anne Gunn, a specialist on muskoxen for the Northwest Territories Wildlife Service, described the status of the species: "Muskoxen are doing very, very well. Their recovery is one of the great conservation success stories. No doubt. People talk of whooping cranes. But the muskox is a wonderful example of when cooperation and restrictions really worked."

Like the species as a whole, our runaway yearling also avoided a tragic end. The Eskimo on Nunivak, about 300 of them living in Mekoryuk, carefully guard the prosperity of the muskoxen, taking almost proprietary care of them. Lying down on the ice, Tom Amos reached down and grabbed the calf behind its budding horns. Kneeling, I took a fistful of fur, soft as thick brown velour, just in front of the hump that joins the neck and back. Together, we hauled the yearling, weighing about 150 pounds, kicking and bellowing up onto the ice. Its brown eyes wide with fright, it shook and sprayed seawater all over us. Like a little bull, it tried to jerk away and then butted me in the thighs and bucked like a horse. In an unlikely Arctic rodeo, we wrestled the young muskox across the pack ice to shore and let it go. It bounded quickly back to the herd.

We had saved the calf from a common fate. Despite their success on the island, muskoxen face their most severe natural enemies in the heavy snows of winter and the drifting ice of early spring. Relaxing on the

Photographs by Art Wolfe

Author (center) helps Eskimo guides rescue yearling from certain death in the icy waters of the Bering Sea.

dunes, exhausted after the rescue, Ed told me, "They wander out on the ice during the breakup. They die on that ice." Stranded on the floes, they starve and then freeze to death. Ed spoke slowly, with the thoughtful, guttural clip of a Chupik Eskimo accent, his voice filled with deep emotion. "No way can they get back to land. There's one that's been stranded out there a long time. They get skinny. Of course, suffering, suffering."

Ironically, the muskoxen that die on the drift ice may be the victims of the species' current success. On Nunivak, muskoxen now exceed the island's carrying capacity. One biologist speculated that the muskoxen may wander onto the ice because they are trying to migrate to other islands. As Sam Patten, game biologist for the Alaska Department of Fish and Game, put it, "These animals are a manager's dream, the way they reproduce and colonize. They are spectacularly successful. We now have the dilemma of having just too many of them."

From their appearance, these curious beasts with their shaggy fur and unusual horns seem improbable candidates for a runaway success story in the modern world. Square and hunkering, muskoxen seem to plod across the tundra with a kind of bovine heaviness. In the monochrome world of an Arctic winter, where it is so easy to be hypnotized by the endless white glare, these large dark beasts drifting across the snow appear as dream shadows, bold and stark—like illusions out of the glacial past. The Eskimo call the muskox *Oomingmak,* which means "the bearded one." They have long outercoats of coarse guard hairs that hang like skirts from muzzle, neck and back. This coat is, of course, an adaptation for the extreme cold temperatures of Arctic winters. Yet it gives *Oomingmak* the prehistoric look of a beast that might keep company with the saber-toothed tiger and woolly mammoth. Actually, the muskox evolved on the steppes and tundra of central Asia, and it really is a relic, one of the last survivors of the great beasts of the Pleistocene. Its scientific name, *Ovibos moschatus,* suggests it is a "sheep-cow," but the Latin is misleading on both counts. More like a goat, its nearest relative is the takin, in the Himalayas.

Muskoxen also have an undercoat of dense wool, called *qiviut,* which Ed's wife and other Eskimo women weave into hats and scarves that are softer and warmer than cashmere. In June, muskoxen shed their *qiviut,* and it hangs from their backs like old rags. The downswept horns—largest on the bulls—are vaguely reminiscent of tusks. From the furrowed boss on the head, the horns flow down each side of the face and up in a quick flip, a bit like petrified curls.

Thousands of years ago muskoxen crossed the land bridge over the Bering Sea from Asia to America. Their remains from ancient glaciations have been

found as far south as New York and Iowa, as well as in ancient caves in France and Spain. They retreated with the glaciers, gradually becoming extinct in Europe and Siberia. Their current range in Alaska, Canada and Greenland (with small introduced herds also in Russia and Scandinavia) is just a remnant, a kind of memorial refuge of their vanished orbit.

Prehistoric Eskimo in North America seemed to have had a close relationship with the muskoxen, sleeping on their skins, eating their meat and even following what archaeologists call "the muskox way" as they migrated east and north into Greenland and the high Arctic archipelago of Canada. But it took the white explorers and fur traders to put the muskox on the fast track to extinction. The slaughter in the Arctic is legendary, evoking analogies with the buffalo on the Central Plains. Guns made the difference. Archaeological remains suggest that in the 19th century the muskox was found in northern Alaska as far west as the Bering Sea. Muskoxen were extinct there by the 1850s or so, the last herd perhaps killed near Barrow. On Melville Island in the Arctic, the Stefansson expedition alone killed 400 muskoxen to use for provisions. By 1930, fewer than 500 were thought to survive on the mainland of Canada.

Yet for all the bovine placidity in its sweet face, for all of its prehistoric associations, the muskox has proved surprisingly resilient. The first step in the recovery was to stop their slaughter. In 1917, Canada amended the Northwest Game Act to protect the muskox from hunting. In 1927, the Thelon Game Sanctuary was established on the Arctic mainland of Canada specifically to protect the remaining populations of muskoxen. According to Anne Gunn, by 1980 the population on the mainland was about 15,000. "The rapid increases continue. It's really good news. On Banks Island, for example, a current population estimate is between twenty and twenty-five thousand," she said. The situation has changed so dramatically that "the recovery has allowed renewed hunting by the Inuit, who have been extremely cooperative. The recovery simply would not have been possible without their help."

In Alaska, however, there were no longer muskoxen to protect. Nevertheless, biologists devised a plan to let the future catch up with the past. Their vision was to reintroduce *Oomingmak* in the state. President Herbert Hoover officially designated Nunivak Island as a National Wildlife Refuge in 1929, for "contemplated experiments in re-establishing the muskox as a native animal in Alaska." In 1930, Congress released $40,000, which purchased 34 muskoxen from Greenland. The transplant was an immediate success: the herd grew to about 750.

Although far south of the muskox's historical range, Nunivak Island was a good choice. It is remote without being inaccessible. Separated from the Yukon-Kuskokwim delta by 18.5 miles of shallow, choppy seas, it offers a sort of natural, self-contained laboratory for monitoring the herd. Eighty miles long by 60 miles wide, Nunivak Island also offers a large Arctic habitat with no predators. There is not a real tree to be seen, and the island seems to squat in a low crouch of flat volcanic cones, interior plateaus and boggy tundra. If the Eskimo originally were unsure about having their island given over to a strange beast they had never seen, they have since integrated the muskox into their culture. With the muskox prosperous enough to legalize limited hunting in 1975, its meat has become a subsistence item in the Eskimo diet. Ed Shavings and Tom Amos also supplement their way of life with the money they earn as professional hunting guides.

Photographer Art Wolfe and I visited Nunivak Island in early April, just before Easter. Ed and Tom took us to the south side of the island, where a large number of the muskoxen winter. Since they are guides for hunters and since they also helped capture the muskoxen for the various transfer operations, they showed us the right way to corner a herd. For me, it was also a demonstration of how easily the species was

Galloping across the tundra, a muskox herd moves with speed and grace surprising in such heavy animals.

Guide Ed Shavings wears woven *qiviut* face mask with white parka, standard camouflage of Arctic hunters.

devastated in the 19th century. Thousands of years of evolution have given the muskox effective defensive strategies against its main predator—the wolf. Against a gun, however, those very same strategies are a pitiful disaster.

We chose a herd of about 20. Muskoxen have acute senses of sight, hearing and smell, and they seemed aware of us a mile away. Yet they stood their ground, reluctant to run, perhaps conserving valuable energy. Ed and Art approached from the east along the sand dunes; Tom and I circled around to the other side, cutting off their line of flight. I took a position on the crest of a dune. When the herd exploded like hairy cannonballs, stampeding toward me, I felt more like Hemingway at Pamplona than I cared to. Galloping, the big beasts were amazingly fast and graceful, their long hair shaking like big shag rugs flying several feet above the dunes. I braced myself against that heart-stopping rush of hair and horns, heard Tom yell a warning and prepared to jump down the steep dune if the herd kept coming.

The map indicates expanding muskox distribution in Canada. Dots in Alaska mark transplant locations.

But they were easy to intimidate. As they thundered closer, I shouted, jumped and waved my arms. They wheeled round instantly, saw Ed behind them and collapsed into a defensive huddle.

With most of the young squashed in the middle, the bulls and cows faced outward, glowering at us from a wall of hooves and horns that a wolf would find impenetrable. Against a gun, however, it would be no contest. The herd pressed together in a tight, shifting, protoplasmic mass. The group seemed to take on a life of its own, circling and shuffling together like a bunch of chained convicts. Occasionally, a yearling popped out of the press. Panicked to find itself alone, it charged back against the closed ranks, trying to squeeze, leap and pry its way back into the safer anonymity of the herd. Disgruntled, the bulls pawed the ground and snorted, but not just at us. In the crush of bodies, they vented their aggression on each other, too, hooking blindly with those sharp horns.

They were brave in a sad, tragic way. Unable to do anything, they made their stand and took what came. With their white markings on their muzzles and foreheads, and hoary saddles, they seemed more vulnerable and endearing than fearsome—almost cuddly, despite their horns. I kept thinking of giant gerbils.

The Eskimo are happy that hunting was opened for

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Bulls have violent, head-bashing confrontation in the competition for cows during the rutting season.

Massive neck muscles and the skull's network of bony struts help animals absorb the shock of impact.

muskoxen on Nunivak Island. As Ed observed, "We got no use from these animals. Eskimos say we should have hunting so the village gets a little income and meat." The muskoxen on Nunivak now have an international reputation among trophy hunters, even though they present little challenge to the sportsman.

Actually, hunting was one of the last management techniques used to try to control the abundant muskox population on the island. After their introduction, muskoxen numbers grew between 15 and 20 percent annually. "Then we had these big historical die-offs," said Sam Patten. "Up to 150 of them would die in a season. In severe winters, we can support about 500 muskoxen on the island." The population has once again climbed to about 750. "The last four winters have been mild, so we've had relatively low mortality," Patten continued. "But we're concerned this year."

The problem is also snow, the critical factor throughout their range in determining the muskoxen's distribution. They are adapted for the polar desert: severe cold and little snow. The Bering Sea is a cradle of storms. Cold air drops like lead out of the Arctic and meets the warm air masses of the Pacific. The results on Nunivak are cool, foggy summers and fierce winter storms that scour the island with 60 mph winds, heavy snows and freeze-and-thaw cycles. As Patten put it, "We get so much snow the tundra turns into layers of concrete." Muskoxen cannot paw through the crusted snow. So in the winter on Nunivak, large numbers of them retreat to the western cliffs and the southern sand dunes. In those areas the winds keep the snow shallow and they can forage on the tall rye grass. This winter range virtually defines the carrying capacity of the island for muskoxen.

Winter kills are brutal. Usually, the carcasses show no particular sign of the cause of death. But some muskoxen drift off on ice floes, while others fall off the 200-foot cliffs. Some even get their long hair wet and freeze to the ground as they rest.

The first plan to help avoid these die-offs was the transplant program. In the 1960s, the Alaska Department of Fish and Game and the U.S. Fish and Wildlife Service agreed "to maintain a nucleus herd of approximately 500 muskoxen on Nunivak National Wildlife Refuge for restocking and restoring the muskox to its traditional ranges in Alaska." Between 1967 and 1981, biologists and wildlife managers shipped 230 muskoxen to four different areas within the state. The first

Charles Bergman is writing a book about vanishing wildlife in North America. He and Art Wolfe last covered elf owls for SMITHSONIAN *in December 1984.*

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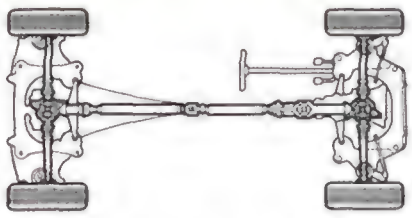

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This baby muskox nibbling affectionately on a cow's horns will suckle until its mother gives birth again.

transplant group was sent to Nelson Island, just 18 miles from Nunivak and separated from mainland Alaska by narrow channels that freeze over. The herd grew at a 22 percent rate, so successful that more than 20 animals have crossed to the mainland on their own, where they are now sighted regularly in two growing herds. The second transfer group went to northeast Alaska. The 64 muskoxen released on the Arctic National Wildlife Refuge had grown to 387 by 1985. Another herd was released on the Seward Peninsula, north of Nome, and there are now about 275 of them in that area. Finally, muskoxen were released at Cape Thompson in the northwestern corner of the state. The increase there is lower, possibly because of the problem of illegal hunting.

Pat Reynolds is a wildlife ecologist for the U.S. Fish and Wildlife Service. She is conducting a baseline study of muskoxen out of the Eskimo village of Kaktovik in the Arctic National Wildlife Refuge, "looking at their ecology on the North Slope and what happened to the introduced herds." The transplanted muskoxen have been so successful, according to Reynolds, because "they're adapted to the Ice Age. Here there is relatively little predation, and lots of unexploited habitat." Flying in a small plane out of Kaktovik, I had the rare experience of seeing a herd of six muskoxen fend off a rather desultory challenge from a lone wolf.

The major factor in their success seems to be the quality of the habitat. With their forward-sloping necks, even more exaggerated than buffalo, muskoxen stretch forward and graze slowly on grasses, sedges, dwarf willows and the creeping plants of the Arctic. "They have small mouths," said Reynolds. "They're more nibblers than gulpers. They move and eat."

With radio collars on 22 muskoxen, and an experimental satellite collar on one of them, Reynolds is studying the herd movements and population size. Muskox cows were thought to come to maturity at about four years of age and to drop one calf every other year. But both Anne Gunn in Canada and Reynolds in Alaska have found three-year-old cows with calves, and a high percentage of Reynolds' collared animals are having calves every year. "The reproductive increase," she said, "is probably related to the high quality of the forage."

Calves are born in April and May and can walk within a couple of hours of birth, keeping up with the herd. There seem to be several kinds of groupings and mixed-sex herds are usually the largest, made up of cows and calves and one or more bulls. These herds swell in size during winter. After four years of age, some of the males seem to separate out and winter in bachelor herds in their own areas. During the rut in July and August, solitary bulls are often seen on the periphery of mixed-sex herds or off by themselves. They may be looking to challenge a bull with a harem. The rutting contests involve violent charges and thunderous head-on crashes. The bulls often wear the badges of their battles. I have seen one male with his left horn missing. The cows spend about nine months, during the winter, pregnant. Infrequently, cows are seen in their own small groups.

From collaring the muskoxen, Reynolds and a colleague have developed a theory on the adaptive value of the white saddle. It may help with heat loss. "As we collared one animal," she said, "it was covered with frost, except for the saddle. After running, the saddle gives off lots of heat." Their wool is extremely efficient at retaining heat and muskoxen seem more stressed by heat, even at moderate temperatures of 50 degrees F, than by extreme cold. The saddle and its underlying vascular tissue may work as a sort of thermal regulator.

The future for the muskoxen appears bright. In both Canada and Alaska, the potential range for expansion along the Arctic coastal plain is vast. As Anne Gunn said, "So far as it is in the power of people to project, the future for the muskox looks really good."

After sledding around Nunivak Island, Ed invited us to share Easter dinner with his family in Mekoryuk. We had muskox ribs and salted salmon tips. On his color TV, we also watched the Fifth Avenue Easter Parade in New York, beamed in by satellite. I was struck by the juxtaposition of past and present. That Easter, I found myself celebrating *Oomingmak*—if not its rebirth, at least the return of an ancient relic.

An adult bull with its brooding Ice Age visage has proved victor against Man's efforts to eradicate him.

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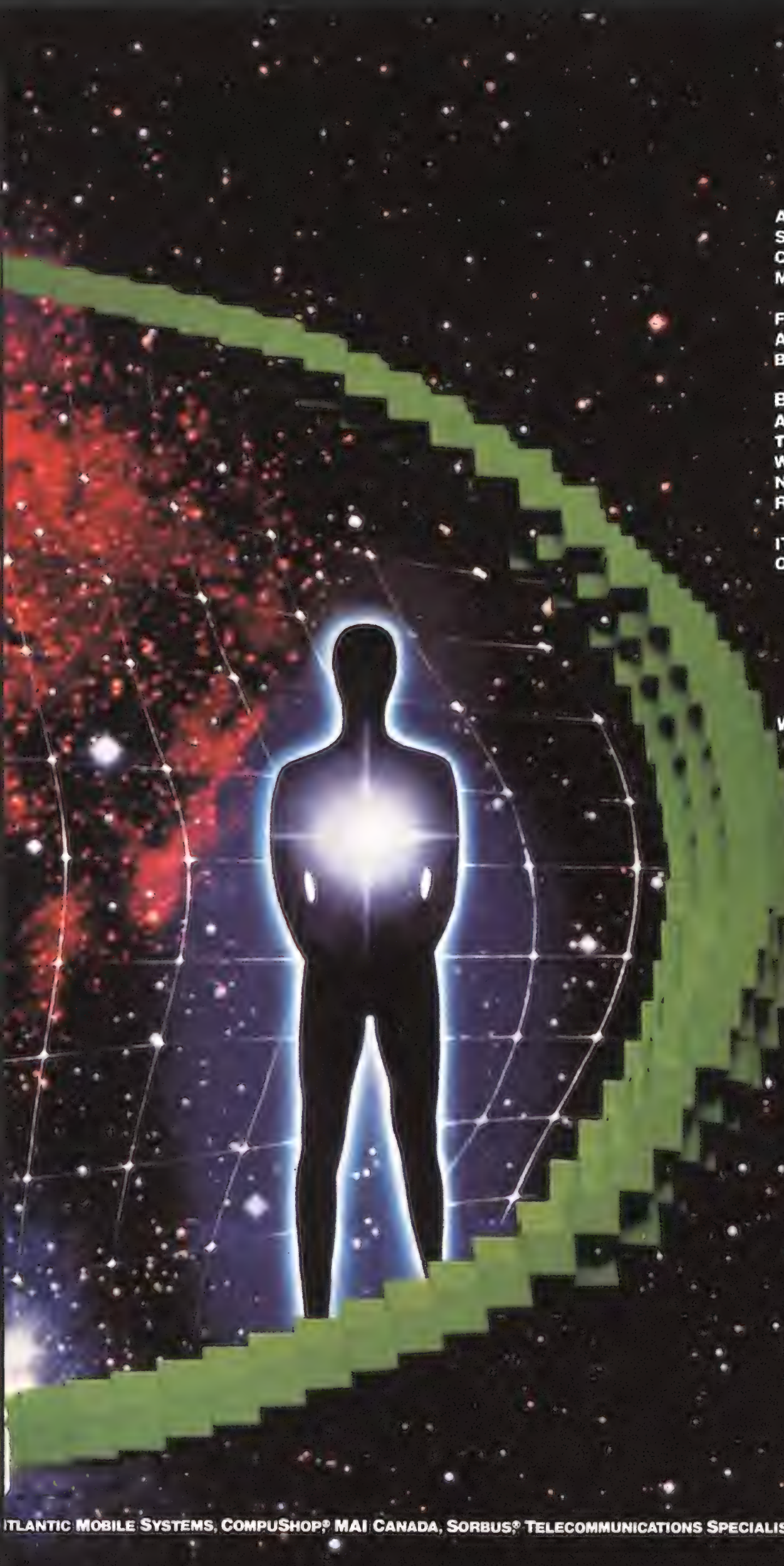

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By Nancy Shute

After a turbulent youth, the Peace Corps comes of age

In its 25th year, the bold experiment that doubters viewed as a fringe foreign legion is finally hitting its full stride

John F. Kennedy had a dream. Twenty-five years later, in the village of Cumbijín high in the Ecuadorian Andes, that dream makes house calls.

Paula Enyeart, a 26-year-old registered nurse from North Dakota, hikes up the green, treeless paramo that coats the ridgetops at 13,000 feet, en route to check up on one of her 550-odd patients. As a Peace Corps volunteer, Enyeart is a mobile 24-hour-a-day health-care system, and on this cold August day, María Antonia Chocha has given birth and needs some attention. A dozen neighbors are already on the scene, bundled in bright shawls and ponchos against the wind-driven rain that pelts their green mountain, and cheerfully anticipating a daytime medical drama.

Enyeart (p. 86), a sturdy woman with bright blue eyes, ducks through the low door of the family's one-room thatched mud hut. Inside, mother and child lie bundled on a plank bed. Hanging next to them in the darkness, close enough to touch, is the dressed carcass of a sheep, a rare luxury in a community where potatoes and barley serve as breakfast, lunch and dinner.

Although Enyeart's Peace Corps supervisor, an Ecuadorian doctor named Miguel Artola, is visiting her today, Chocha has no intention of letting a man examine her. Instead, Enyeart speaks to the woman in Spanish, questioning her gently and relaying to Artola what her hands discover. The woman trusts Enyeart, not only because the pale foreigner is a woman but because she has lived among them for three years, getting by on the barley-and-potato diet, pounding her clothes clean in the streambed and crawling into bed by 7 o'clock with no electricity to warm or light the bitter mountain night. Not many people choose to endure Cumbijín's harsh beauty. Even the Ecuadorian assistant who works in the village's health center goes home to the comforts of Salcedo each night, one hour down the mountain.

The diagnosis is that Señora Chocha did not deliver all of the placenta; without medication, she is in danger. The nearest pharmacy is in Salcedo. Cumbijín is so remote that not even the ramshackle rural buses that provide most of the country's transportation come by. Enyeart grabs her warmest parka, hitches a ride in the back of a passing truck and is bounced and bruised as it careens down the rutted dirt road.

Late that night, after a cold truck ride uphill, Enyeart returns with the medicine. But the señora, despite her suffering, refuses to take the injection and Enyeart is unable to convince her that it's safe. The next day, Enyeart retraces her journey to buy pills. Two weeks later, in the Peace Corps office in Quito, Enyeart reports with an amazed smile that both mother and son are doing well.

Enyeart's determination in the face of misery and ignorance is testimony to the strength of her spirit, but her efforts testify to a larger spirit, too: in its 25th-anniversary year the Peace Corps, the unique experiment in international development, is working harder than ever before.

Just five years ago the Peace Corps looked like a dream whose time had come and gone, its idealism ineffective against the harsh realities of the late 20th century. But after surviving a euphoric childhood in the '60s and a dark and difficult adolescence in the '70s, it has grown up to become more professional, more pragmatic and ready to strive for adulthood.

Floating the idea at two in the morning

Although a Peace Corps had been proposed by then Senator Hubert H. Humphrey as early as 1957, it took Kennedy's inspirational magic, or Kennedy's times, to make the idea a reality. Arriving at 2 in the morning for an appearance at the University of Michigan on October 14, 1960, just after finishing a televised debate with Richard Nixon, Presidential candidate Kennedy spoke from the steps of the Student Union to a huge crowd of waiting students: "How many of you who are going to be doctors are willing to spend your days in Ghana? Technicians or engineers, how many of you

Screwdriver in hand, Nancy Jacobson gets a hug in Ecuadorian village; she is installing a water system.

Photographs by Pedro Meyer

Volunteer Jacobson joins final pipe lengths, ending six-month project to bring spring water to Pachanilláy.

Thomas Tanguay seines a model fish-culture pond; ocean fish are plentiful in Ecuador, so interest is low.

At nursery in Quinindé, Ecuador, volunteer Glen Guenther helps grow trees for reforestation project.

are willing to work in the Foreign Service and spend your lives traveling around the world? On your willingness to do that . . . your willingness to contribute your life to this country I think will depend the answer [to] whether a free society can compete."

Despite the late hour, Kennedy's challenge was met with a roar of approval. On March 1, 1961, less than five months after his election, President Kennedy signed the Peace Corps into being. Its three imprecise and grandiose goals: "To help the people of interested countries and areas in meeting their needs for trained manpower; To help promote a better understanding of Americans on the part of the people served; To help promote a better understanding of other people on the part of Americans." In the early years, anything seemed possible except failure. Sargent Shriver, the Peace Corps' first director, remembers the initial year as one of driving determination: the small cadre of young people like Harris Wofford and Bill Moyers who joined Shriver to create the organization were not about to let the experiment falter in the face of widespread skepticism.

To ensure that the volunteers would not succumb to exotic ailments or crack under the stress of living in primitive conditions, the staff devised a rigorous series of physical and psychological tests. As the first volunteers were run through training camps similar to those of Outward Bound, Shriver circled the globe persuading Third World leaders to welcome the new recruits.

The founders worked hard and fast: by January 1, 1962, nine months after it was created, 750 Peace Corps volunteers were working in nine countries.

Emily Winter was one of those early volunteers. The daughter of a German immigrant couple in Chicago, she signed up in 1963 at the age of 21. "I was as idealistic as the next person," she says now. "It seemed like a good opportunity to see the world and go to work."

On November 22, 1963, the day Kennedy was assassinated, Winter was leaving for training in Puerto Rico. "It was such a shock," she recalls. "There was concern as to whether we would actually get into the field." She was sent to Ecuador; not long afterward she met and married volunteer Peter Gladhart. They moved to Mira, a small town in the mountains just south of the Colombian border, to work on a huge array of projects from goat raising to sanitation to nutrition. As community-development workers they were encouraged by the Peace Corps to search out "felt needs" of the community and invent programs to meet them. Emily Gladhart found one in the town's women: they had no way to earn money other than selling produce in the market, and money was desperately needed to pay for their children's education and basic household needs.

The author, a free-lance writer who lives in Washington, D.C., recently spent four weeks with Peace Corps volunteers in Ecuador.

She suggested knitting sweaters to sell, as well as for themselves, an idea that had been introduced elsewhere in Ecuador by volunteers. Gladhart contributed time-saving innovations like circular needles and helped them set up a cooperative. Many tears were shed when laboriously knitted pullovers failed to meet the cooperative's quality-control standards and were unraveled to be reknit. But success spoke louder than frustration: where a woman would have to work eight days in the fields to earn 50 sucres, the equivalent of $2.50 or a pair of men's shoes, she could earn 68 sucres for knitting one sweater. Within a year, the 40 women in the cooperative were knitting 120 sweaters a month and had saved 6,500 sucres.

By 1965, the number of volunteers worldwide had soared to 7,900, as the U.S. press reported on heroic volunteers conquering poverty, disease and ignorance with their bare hands. But "in-country," where it counted, the reality of the Peace Corps was far less bright. For every Emily Gladhart who ferreted out a "felt need," other volunteers floundered. Host countries complained about being inundated with troops of young Americans unable to speak their language, understand their culture or offer anything other than youthful exuberance. For their part, many volunteers complained bitterly about being "parachuted" into a community, armed with nothing but a suitcase and a vague injunction to do good.

Community-development programs, which repre-

Former volunteer Emily Gladhart visits Mira, where she helped women start knitting business 20 years ago.

sented the core of the Peace Corps premise of teaching people how to better their lives, came in for particularly sharp criticism. Two former staff members, C. Payne Lucas and Kevin Lowther, charged that only one in 20 community-development volunteers accomplished anything.

These failings were documented by the Peace Corps itself: in its zeal to keep afloat, the agency set up an internal-evaluation system unparalleled in the annals of American bureaucracy. Led by journalist Charles Peters, teams of outside evaluators were dispatched abroad to investigate in-country operations and "raise hell." They did, unflinchingly, and their criticisms were acted upon by Shriver, with entire overseas staffs sacked on occasion. In order to keep its missions from lapsing into complacency, the Peace Corps discouraged its volunteers from remaining more than three years abroad, and limited staff to five years' service.

Meanwhile, the purpose of the Peace Corps was a constant point of passionate internal debate. Shriver adamantly opposed turning the Peace Corps into another bureaucracy like the Agency for International Development, arguing that the "basic humanity" of volunteers would triumph where intricate programs and expensive projects would not. The fact that countries still requested more volunteers than the Peace Corps could deliver proved to Shriver that they were doing something right. But, increasingly, the host countries were calling for volunteers who could educate their people in more than just goodwill.

Jack Vaughn, who took the helm from Shriver in 1966 after serving as head of the Latin American region, believed that without more substance to support the program's reputation, the Peace Corps was in danger of collapsing under its own inflated image. He reduced the number of liberal-arts types in favor of technically skilled volunteers and trimmed community-development projects from 26 percent to 14 percent. Emphasis in training was placed more on language and skills and less on personal development. The number of volunteers in-country was cut from an all-time high of 15,556 in 1966 to 12,131 by 1969. "We've all been sobered by what we're up against," said Vaughn in 1969, "and by what it takes if we are to light a candle."

While the Peace Corps was altering during the 1970s to meet the sobering realities of Third World Development, the world was changing in ways that were to dampen the agency's new resolve. Anti-American sentiment rose abroad as the United States escalated its involvement in the Vietnam War. Early in the decade, the Watergate scandal further tarnished the remnants of Kennedy's New Frontier, and volunteers who years before would have been greeted with reverence were now assailed as being CIA operatives or agents of American imperialism. Despite its insistence on political neutrality, the Peace Corps was often used as a pawn in global politics, with regimes alternately courting and then forcibly evicting the Peace Corps as their relationship with the United States changed.

By 1980, volunteers were older—average age 27—and wiser than their predecessors, with 80 percent offering technical skills like forestry, agricultural extension, engineering, animal husbandry, business administration, special education. The Peace Corps bureaucracy was strengthened, with host-country nationals serving as program managers to oversee volun-

Gladhart now imports sweaters to the U.S.; here, she tries one on while chatting with Doña Guerrero.

teers in the field, and volunteer projects tied into existing programs of the host country or private development organizations.

But if the professionalism of the Peace Corps had changed for the better, the sense of mission seemed to have changed for the worse. Despite the publicity accorded President Jimmy Carter's mother, Miss Lillian, as an older Peace Corps volunteer, few Americans seemed aware of the agency's quiet successes overseas. By 1980, many thought of the Peace Corps as an anachronism, a holdover from the halcyon '60s. With Ronald Reagan's election, conservatives predicted it would be one of the first casualties in the new President's war on the federal bureaucracy.

Not everyone agreed. Loret Miller Ruppe, the wife of a former Michigan congressman, had worked on the Reagan campaign. She wanted to become director of the Peace Corps, arguing that a hard-working volunteer was exactly what citizens of the Third World needed to see in this age of American materialism: "They've seen *Dallas* and *Dynasty*. I think the statement of a Peace Corps volunteer in the '80s has more impact than in the '60s." She got the job.

A warm, straightforward woman who is not reluctant to tell volunteers to write their mothers—her own daughter Loret is a volunteer in Nepal—Ruppe set to work convincing the White House that the Peace Corps was cost-effective and in harmony with the President's emphasis on volunteerism. A volunteer, she pointed out, costs $20,000 to keep in the field for a year, as opposed to $100,000 for an AID employee.

To recruit career-oriented young Americans, Ruppe drummed up praise from executives like Chrysler chairman Lee Iacocca and Citibank executive vice president George J. Clark. "The individual initiative required to succeed in such situations is the very quality we look for when hiring for Citibank," Clark wrote.

The campaign worked: when in early 1985 Ruppe made a plea for 10,000 volunteers with agricultural skills to work in famine-stricken regions of Africa, 20,000 people called. "Of course, only 1,000 of those had agricultural skills," Ruppe says wryly, "but it's a start." She wants to have 10,000 volunteers in the field by 1990, a goal backed by both Congress and the administration. But she admits that it will be hard to achieve given the strictures of the federal budget.

Ruppe has also placed increased emphasis on the oft-neglected third goal of the agency: how returned volunteers contribute to our understanding of the rest of the world. What Peter and Emily Gladhart learned in Ecuador in the '60s brought them to Michigan State University, where Peter is an associate professor specializing in rural development and Emily is an academic advisor.

But Ecuador never gave up its hold. In 1979, the Gladharts packed up their two children and went back to Mira for a 15-month sabbatical to do research on the sweater-knitting business. They found the cottage industry booming, with 1,000 families in two provinces producing 6,000 sweaters a month. "We wanted our kids to see what had happened," Emily says. "It was a great experience for all of us."

Emily Gladhart has reaped a more tangible benefit from her Peace Corps days. In 1981, she started her own small handicrafts-import business and now travels to Mira every year to buy sweaters and get advice on shipping and export duties from some of the same

Ponchos, aprons, other items are sewn and sold by women in Puembo with guidance from Joanne Bailey.

Kathleene McCullough pays a house call with Dr. Artola, her in-country public-health supervisor.

In Cumbijín, volunteer Paula Enyeart and Quechua Indian father admire his eight-hour-old son, Marcos.

women she introduced to circular needles 20 years ago.

Accompanying Gladhart on a sweater-buying excursion to Mira last August, one could see that far more than business was transacted in Gladhart's visits from house to house along just-paved streets (p. 84). As Gladhart tried on each thick, richly-dyed sweater to test the length of sleeve and evenness of stitch, she and the Mireñas talked of new designs and colors, of the price of raw wool and the vagaries of the American consumer, but also of children and illnesses and Doña Anita Guerrero de Muñoz' three-story house rising on the outskirts of town, a house worthy of any boulevard in Quito and built entirely of sweater money—meaty local gossip that transcended language or borders.

Although most of the 120,000 or so returned volunteers aren't as entwined with their Peace Corps past as the Gladharts, they do turn up in interesting places. Five members of Congress are former volunteers, including Connecticut Senator Chris Dodd. Paul Tsongas, former Senator from Massachusetts, is also an alumnus. So are former New York City Council President Carol Bellamy, author Paul Theroux and Joan Tarplay Winn, the first black woman judge in Texas. Ten percent of Foreign Service officers are returned volunteers; so are 500 AID employees, including director M. Peter McPherson, and 250 congressional aides.

Sargent Shriver couldn't be more delighted to see Peace Corps alumni joining agencies that sneered at it 25 years ago. Although he and many former Peace Corps volunteers worry that the Reagan administration's emphasis on closer collaboration between the Peace Corps and agencies like AID could endanger the Peace Corps' political independence, Shriver asserts that AID is moving away from its emphasis on expensive infrastructure developments to the "small-is-beautiful" philosophy of the Peace Corps.

To fathom how well the Peace Corps works today, it must be seen in-country, where success or failure is judged by the people who live with it. Ecuador is one country that should know: since 1962 Ecuador has hosted 3,000 volunteers, a long and amicable association unbroken by the ideological shifts that have sundered relations with other countries. In fact, Ecuador and Paraguay are the only two countries in South America requesting volunteers. (Distrust of the United States and need for workers more skilled than the Peace Corps can offer in certain specialized areas like agriculture keep other South American countries from requesting volunteers.) And Ecuador has no shortage of work to be done. Although its Amazon oil reserves have helped Ecuador avoid the political and economic instability that plague its neighbors Colombia and Peru, the Colorado-size country is still one of the least-developed in South America, with serious problems of deforestation, soil erosion and malnutrition. More

A registered nurse from North Dakota, Enyeart helped with post-delivery complications, fetched medicine.

than half of its people live in rural poverty, scratching a precarious existence out of a few acres of land.

It is also one of the most spectacular, a pocket paradise of cultural and topographical contrast where a few hours' travel in a four-wheel-drive truck can transport you from the tropical coast to the glacier-capped heights of the Andes, from bustling, modern cities like Guayaquil or Ambato to Quechua Indian villages where the silence of the past lies centuries deep. And in every corner of the country there is a Peace Corps volunteer: planting trees near Santo Domingo, teaching in a special-education school in Cuenca, vaccinating babies in Mariano Acosta, installing water faucets in Pachanillay, coaching a track team in Quito.

Today's volunteers defy stereotyping. Eight percent of them are over 50. Joanne Bailey, age 54, is a former travel agent from California. She lives in Puembo, east of Quito, where she works with teen-age girls on home-economics projects (p. 85). Jose Opalia, 79-year-old Iowa grandfather of 40 children, came to the country's tropical lowlands to teach the bamboo construction that he learned as a child in the Philippines.

For the 234 volunteers now in Ecuador, life is often easier than it was for their 1960s counterparts: few live as primitively as Paula Enyeart, and many more live in modern cities like Cuenca, Ambato and Riobamba. They clatter in and out of the Peace Corps headquarters, a big white house in downtown Quito, to collect mail, cash checks, get medical attention and to meet with the largely Ecuadorean staff of program managers who serve as the link between the volunteers and the government agencies most of them work for. The permanence of it all, the institutional stability, amazes early volunteers who can remember being in the field for a year without seeing another soul from the Peace Corps. Yet still today, volunteers in the field largely work alone and must struggle with pressures of an alien culture and loneliness.

Worry about volunteers going "deep campo"

Almost a quarter of all volunteers quit, either in training or on the job. To keep them from forgetting their native culture—going "deep campo," as the volunteers call it—the Peace Corps office mails each of them an international edition of *Newsweek*. Many also depend on a more contemporary form of cultural communication: portable tape players.

Peace Corps volunteers are notoriously impatient with the byzantine workings of bureaucracy, be it those of Ecuador, the Peace Corps itself or the local village. At their best, they overcome institutional inertia with creative enterprise: Paula Enyeart cadged $2,600 out of her grandmother to help a nearby village build a health center that had been vetoed by the Ministry of Health. At their worst, they form a force of some of the most sharp-eyed critics on the face of the Earth, lambasting anyone and anything that stands in the way of their projects, not the least of which are their own failings.

Enyeart, for example, will tell you with regret that she had to move out of her host family's house to a dark, miserable room because their cooking was killing her—she lost 30 pounds during her first year in Cumbijín due to intestinal parasites. "No matter how much I talked and asked and begged, I couldn't convince them to wash the dishes with soap." She also admits to getting tired of being dragged out of her sleeping bag night after night for the latest medical emergency, of never having time to herself.

Still, she signed up for a third year, like 14 percent of all volunteers. She looks at the job's difficulties pragmatically: on immunization days at the Cumbijín school, she wears track shoes the better to intercept her

reluctant young patients, many of whom believe that vaccinations cause illness rather than prevent it. "They escape through the windows," Enyeart says, "and their parents encourage them."

Though the volunteer in-country often sees only how much isn't getting done, those with whom they work know that their sweat is more than a gesture of goodwill. All 22 of the Peace Corps' public-health volunteers, including Enyeart, work for Ecuador's Ministry of Health. Its director of community development, José Castro, is typical of officials in many host countries who want trained Peace Corps volunteers and know exactly how they'll put them to use. In some cases, he says, the gringo volunteer is more popular in the villages than the local public-health doctor. "They have a sense of community action, which the community itself doesn't necessarily have," he says. "And they live there more than the doctor does."

Victoria Tamariz de Vintimilla is not a typical recipient of Peace Corps assistance: wealthy, educated and sophisticated, she has more in common with a resident of Cleveland than with one of Cumbijín. But in 1976 she needed help: nowhere in Ecuador was there a special-education school, or even a teacher, for her four-year-old mentally retarded daughter. Through friends, Vintimilla tracked down Margaret Mahoney, a Peace Corps volunteer in Ecuador with special-education training, and with her established Nuevo Mundo, a special-education school in the provincial capital of Cuenca. Today, Nuevo Mundo is one of 70 such schools in Ecuador, six in Cuenca alone.

Delivering a spirit of caring

Although the Peace Corps has proved its effectiveness in delivering the tools of development, it has also proved anew its ability to deliver a far more fragile American export: a spirit of caring. Mike O'Connor is a civil engineer, the kind of skilled technician that exemplifies the Peace Corps volunteer of the 1980s. A tall, cheerful 29-year-old from Kansas, O'Connor is working with the Ecuadorean water and sanitation agency to install water systems near Riobamba in the central Andes. He has been deaf since birth, one of four handicapped volunteers now in Ecuador.

Although handicapped people are not integrated into Ecuadorean society, O'Connor has no problem communicating with his agency co-workers: they scribble back and forth in Spanish in blue graph-paper notebooks. Milton Silva, one of O'Connor's supervisors, says, "If he's an engineer, how handicapped can he be?"

But scribbling won't work with his clients, the 5,000 residents of five Indian villages below the icy slopes of 21,000-foot Chimborazo. They speak Spanish as well as their native Quechua, the language of the Incas, but cannot read or write.

For weeks, the villagers have been organizing daily *mingas,* volunteer work parties in a tradition that traces back to the Inca empire's highly organized public works program, to dig trenches for the tubing that will carry fresh water down from the spring to their homes. As many as 400 workers have come in a single day, swathed in magenta and blue shawls and more somber ponchos, babies tied on the women's backs. Laughing and chattering as they toss shovelfuls of black volcanic mud over their heads, they make a

Near Riobamba, Ecuador, volunteer Mike O'Connor discusses a water-system ditch route with Jose Velasco.

bright line snaking through the green meadow below Chimborazo peak. On a good day, they've dug a mile.

At the site, O'Connor helps organize the work parties and interprets blueprints. When a worker approaches to ask the deaf man a question, he does it with gestures. O'Connor "talks" back just as easily, not in American Sign Language but with universally articulate motions illustrated by occasional points at the blueprints. Information conveyed, the two men smile and the work continues.

The spirit that drew O'Connor to the Peace Corps explains, more than anything else, why the agency endures. Like everyone else, when asked why he had joined he wrote that he sought experience and adventure. Then he continued: "My primary reason is . . . I was sent to a residential school for the deaf which was supported by the state. Went through college with the help of vocational rehabilitation and the Social Security people. Made it through classes with the help of support services, such as interpreters, note takers, and tutors. . . . I felt like somebody has been giving me the help all my life. Now the Peace Corps is there, where I can contribute my engineering skills. That's something I am able to give, for a change."

Since O'Connor has been deaf since birth, Velasco, the Peace Corps country director, uses sign language.

By Cassandra Tate

Whistlers blow new life into a forgotten art

At annual competitions, the performers pop, suck, finger and trill their virtuoso tones out of the thin air, often with artistic results

Listener at the 8th International Whistle-Off seems awed by sounds made solely by mouths and hands.

At a memorable point in the 1944 movie *To Have and Have Not,* Lauren Bacall pauses at the door of Humphrey Bogart's room, gives him a smoky, long-lashed look and purrs: "You know you don't have to act with me, Steve. You don't have to say anything, and you don't have to do anything. Not a thing. Oh, maybe just whistle. You know how to whistle, don't you, Steve? You just put your lips together and blow."

She was mistaken, about the whistling anyway.

In fact, whistling is a matter of no little complexity, involving a delicate interplay between the lips, teeth, tongue, jaw, oral cavity, larynx, rib cage, abdomen, lungs and, occasionally, the hands and fingers. Sounds are produced by the vibration of air through a resonating chamber created by the whistler's mouth or hands. Pitch, clarity and strength are governed by the size and shape of the chamber and by the way air flows through it. Different tones are produced by using the tongue, hands or fingers to change the space, narrowing it for high notes, widening it for low—much as pipes of varying sizes are used to create different tones on an organ. The teeth, or sometimes the fingers, serve as reeds to make the air vibrate.

"The most crucial thing is the tongue," says William Tiffany, professor emeritus of speech at the University of Washington in Seattle. "The shape of the lips and the mouth in general are important, but to a lesser degree. The major factor is the type of space produced in the mouth by the tongue."

That just about wraps up what's known about the physics of whistling. The level of scientific interest in the subject has been modest, at best. "Not a lot has been done with whistling," Tiffany says, understating the case, "but there should be. It would make a good doctoral dissertation."

In some parts of the world, whistling is not merely a form of entertainment but a means of communication. Natives of La Gomera, one of the Canary Islands, speak to each other with a whistle language that has been in use since aboriginal days. In hilly terrain, the *silbo* (Spanish for "whistle") can be heard over distances of up to three miles. Whistle languages have also been reported in certain villages in the Pyrenees, Mexico, Guatemala, Turkey and Africa. Even so, the subject has attracted little scholarly attention.

If the science of whistling has been neglected, the art has not, as was demonstrated at the 8th International Whistle-Off in Carson City, Nevada, last fall.

Fifty-one of the country's best whistlers puckered up —figuratively, if not always literally—and blew during the contest, held on a sunny weekend in a city park shaded by yellow-leafed cottonwoods. They whistled Bach and Beethoven, opera, jazz, Broadway show tunes, polka, '50s pop, you name it; one fellow even whistled rock and roll. There were conventional puck-

Color photographs by Dan Lamont

Nancy Foran performs from her classical repertoire at Whistle-Off, held last fall in Carson City, Nevada. Her Victorian garb honors the 100th anniversary of the debut of Alice Shaw, a whistler in the golden era.

Artistic whistling makes a comeback

Competing in novelty category, Judith Roberts stood on head for six minutes to whistle "Footprince."

erers, throat whistlers, people who whistled through their hands or fingers. They fought the high altitude and dry air with such remedies as glycerin, mints, throat lozenges and gargles of everything from distilled water to Mountain Dew to a concoction called "canned spit." One woman used a foot cream for lip balm, explaining, "It tastes terrible, so it keeps me from licking my lips." Another whistler favored trombone oil to, as Chaucer put it, keep "hir joly whistle wel ywet."

The most accomplished of the whistlers sounded as if they were playing flutes or recorders. They could trill; do swells, runs, cadenzas and other flourishes; double note (in which one note follows another so quickly it sounds like two people whistling in the same key) and harmonize (in which the whistler changes octaves smoothly and rapidly, producing an effect that sounds like two people whistling in harmony). One can only wonder what Prof. Charles G. Shaw would have made of them.

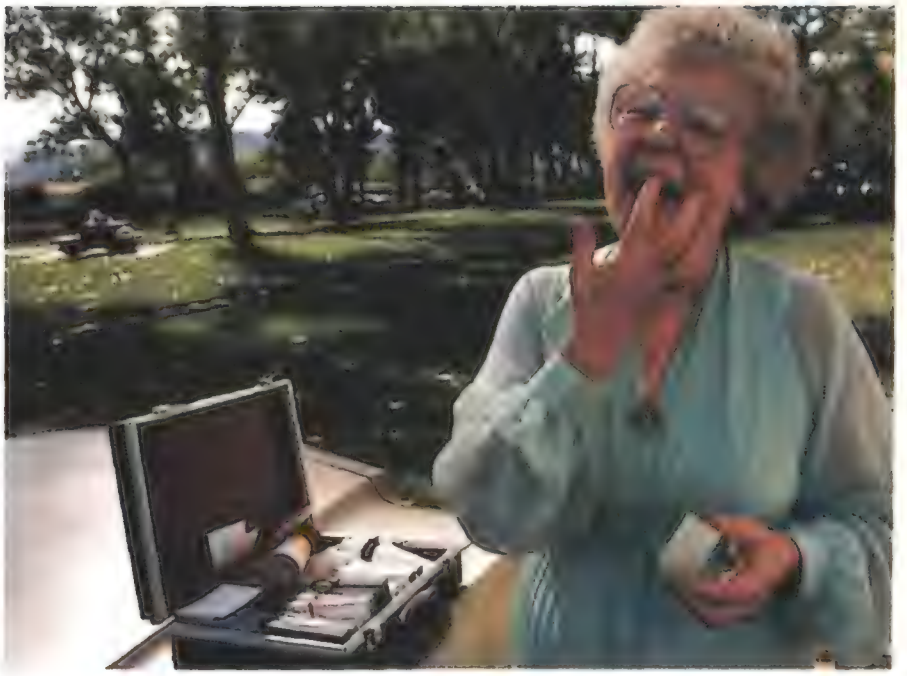
Professor Shaw was a distinguished philosophy teacher at New York University who claimed, in an interview with the *New York Times* in 1931, that "Whistling is an unmistakable sign of the moron." According to the professor, "No great or successful man ever whistles. No, it's only the inferior and maladjusted individual who ever seeks emotional relief in such a bird-like act as that of whistling."

Whistling devotees were quick to respond. Professor Shaw was deluged by mail and assaulted by the incessant whistling of students parading up and down the corridor outside his office. It was duly reported that former Presidents Theodore Roosevelt and Woodrow Wilson, aviator Charles Lindbergh, industrialists Henry Ford and John D. Rockefeller jr., scientist Albert Einstein and veteran Idaho Senator William E. Borah were among the ranks of whistlers, joining, among other luminaries, Santa Claus ("He sprang to his sleigh, to his team gave a whistle/ And away they all flew like the down of a thistle").

First of the artistic whistlers

It was pointed out that Professor Shaw was surely no relation to Alice J. Shaw, "La Belle Siffleuse"—the first and most celebrated of the "artistic whistlers" who charmed audiences in the United States and Europe from the 1880s through the 1930s. Mrs. Shaw filled concert halls, lyceum auditoriums and the drawing rooms of the rich with demonstrations of a whistle that one critic described as "A most comprehensive instrument, capable of stress, swell, staccatos, trills and tremolos, with a range of two and a half octaves." Another compared her to a "Magic Flute" whose "notes burst forth gaily like the laugh of a bobolink" and then "sink away soft as the evening breeze."

To counter Carson City's dryness and high altitude, Jeanne Hum resorts to a spray some call "canned spit."



To keep from licking her lips, Betty Sylliaasen applies bad-tasting mentholated cream before whistling.

Mrs. Shaw was a New York society woman with an extraordinary embouchure and a need to support herself and her four daughters. She turned to whistling, making her debut in 1886, and performed everything from opera to ballads such as "Annie Laurie" to instrumentals composed especially for her. Her range and power were such that she could be heard up to two blocks away. A group of London doctors examined her at one point and attributed her virtuosity to the fact that the roof of her mouth was unusually high and narrow. William Tiffany is among those who suppose that Mrs. Shaw's palate had less to do with her skill than her diligence: she practiced intensely every day.

In 1888, Mrs. Shaw helped launch a new era in entertainment by becoming one of the first performers to be recorded on the wax cylinders developed for Thomas Edison's Improved Phonograph. Whistling proved to be well suited to the new medium. By 1900, the Edison company's most popular recording artist was a whistler named Joe Belmont ("The Human Bird"). When the Victor Talking Machine Company began making double-sided discs in 1908, one of the first releases was a record with Mrs. Shaw whistling "In Venice" on one side and Joe Belmont whistling "The Bird and the Brook" on the other.

The "artistic whistlers" of the Victorian Age were succeeded by the "sifflers" of the Big Band era. One of the most notable was Fred Lowery, a featured artist with the Horace Heidt orchestra in the 1930s and '40s. His muscular control was such that he could whistle without puckering, producing tones of remarkable clarity. He made at least a dozen records; one, "Indian Love Call," sold more than a million copies.

By the 1940s, there were half a dozen schools to help aspiring whistlers perfect their art. The first and most successful of these was the California School of Artistic Whistling at Los Angeles, established by Agnes Woodward in 1909. Miss Woodward had studied opera at the Detroit Conservatory of Music, but she strained her voice so seriously as a student that she had to abandon her dreams of becoming a singer. She turned to whistling instead and eventually developed a method for teaching that skill to others. After opening her school, she organized an all-girl Bird Whistling Chorus, composed of 30 students. The chorus was in great demand for conventions, banquets, weddings, even funerals. She also wrote a textbook, *Whistling as an Art*, published in New York in 1923.

Whistling seems to be something you either pick up at a young age or never pick up at all. Nancy Foran, a Yakima, Washington, school official who bills herself as the "First Lady of Whistling," has been at it since she was in the third grade, when she warbled "Listen to the Mocking Bird" and the old Fred Lowery hit, "Indian Love Call," during a grandmother's tea. She showed enough promise that her parents sent her to Los Angeles to study at the Agnes Woodward School for three summers, beginning in 1942. She is the only woman to have been declared Grand Champion at the Whistle-Off (in 1981). She was a featured performer at this year's contest, appearing in a Victorian costume in honor of Alice Shaw (p.91). She insists that whistlers are "musicians, not gimmick people."

Indeed, there is much to be said in defense of whis-

Cassandra Tate, a frequent SMITHSONIAN *contributor, is studying history at the University of Washington in Seattle, and claims she can't whistle worth a toot.*

In whistling's heyday, Alice Shaw (above) recorded; Agnes Woodward (at piano) founded the first school.

tling, virtuoso or otherwise. It is a sound that by its very nature suggests happiness. A whistler never loses his instrument; it doesn't need to be cleaned, assembled or tuned; it costs nothing and it's eminently transportable. The whistler may not have rings on her fingers or bells on her toes, but she shall have music wherever she (or he) goes.

"The human whistle is the most delightfully informal of instruments," Robert H. Schauffler observed in the *Atlantic Monthly* in 1910. "It needs no inglorious lubrication of joints and greasing of keys like its dearest relative the flute. It is not subject to the vocalist's eternal cold. It knows no inferno of tuning and snapping strings, nor does it need resin for its stomach's sake. . . . Its only approach to the baseness of mechanism is in a drainage system akin to that of the French horn, but far less brazen in its publicity."

It should be noted that a whistling renaissance would not be greeted with universal rejoicing. Unfortunately, there seem to be more bad whistlers around than good, and even the efforts of the latter are not always appreciated by people within earshot. Tuneless and/or insistent whistling can drive anyone crazy. In close quarters, there's no escaping a whistler in full throat, so to speak. That's why people who whistle while they work often provoke more hostility than admiration from their colleagues.

In folklore, whistling has long been associated with bad luck. In Arab countries, it is said that a whistler's mouth stays unclean for 40 days. An ancient superstition holds that whistling on a ship will call up a storm. In mines, that it will cause an explosion. Whistling in a theater portends a short run or other misfortune. In the South, it's unlucky to whistle on Sunday or in a house at any time. And a woman who whistles anywhere has been widely recognized as ill-omened. According to one common proverb, "A whistling girl and a crowing hen/ Will surely come to some bad end." Another warns that "Every time a woman whistles/ The heart of the Blessed Virgin bleeds."

All this was blithely ignored at the Carson City Whistle-Off, where both men and women whistled up a storm, indoors and out (at one point even in a theater) with the best whistling reserved for a Sunday —all to no apparent ill effect.

Among the regulars at the contest is Peter Hassell of New Rochelle, New York, winner of the male classical division in 1979, '82 and '83, and one of the judges last fall. A tall, bearded, soft-spoken man of 35, Hassell produces resonant, woodwindlike sounds by whistling through his hands. His fingers, interlocked rather than cupped, are used to control tone, like valves on a trumpet. "It works on the same principle as a flue organ pipe," he says. "I create a chamber with my interwoven fingers. I blow a stream of air into the chamber through a small opening at the base of my thumb knuckles. The air deflects off one of my forefingers, going into a motion that creates a sound. The same kind of thing happens when you blow into a Coke bottle." Well, not exactly. When was the last time you heard the overture to *The Barber of Seville* played on Coke bottles?

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Barry Rector puckers in "teeth and tongue" style.

Not a puckerer, Lillian Williams uses her fingers.

Peter Hassell clasps his hands to form resonating chamber.

Champion whistler Amy Rose, 11, lives in Louisburg, North Carolina, site of National Whistlers Museum.

Like most good whistlers, Hassell started early. There was one problem, he says: "My parents were paying good money for me to take tuba lessons, and here I was, fooling around and playing my hands. So we reached an agreement whereby I could practice my hands, but only after I'd put in 45 minutes every day on the tuba." Last year Hassell's dedication made him Grand Champion at the 12th annual National Whistlers Convention in Louisburg, North Carolina, also home of the National Whistlers Museum.

The runner-up to Hassell in that contest was Joel Brandon of Oakland, California, who puckers up and inhales when he whistles. Many skillful whistlers produce sounds while blowing in as well as out, but Brandon whistles only while inhaling. His notes are startlingly clear, in perfect pitch, covering a range of three octaves. Listening with one's eyes closed, the sounds could be coming from a synthesizer, not a human being. The effect is impressive enough that he has whistled in nightclubs, on records, in commercials, at jazz festivals and elsewhere—including a San Francisco Giants baseball game, where, naturally, he whistled "The Star-Spangled Banner." He whistled with the Oakland Symphony Pops Orchestra earlier this year.

Brandon, 37, is a professional musician who plays the flute, sings backup vocals and writes jingles for commercials. He developed his distinctive whistle when he was about seven years old. "At first, I was a little embarrassed about how I whistled because it looked so funny," he says. He has never met anyone who whistles like he does, although his pucker is reminiscent of those depicted in the Tsonokwa ceremonial masks made by Northwest coastal Indians. "I'm cer-

A rare inhaling whistler, Joel Brandon sucks in notes.

Jazz and pop tunes are Dan Bernstein's favorites.

Jeanne Hum, on the other hand, prefers Puccini.

tain I can't be the only one who does this," he remarks.

He was a great crowd-pleaser at last fall's Whistle-Off, bringing down the house with a hard-driving version of "Blue Rondo à la Turk" in the preliminaries in the contemporary category. In the finals in that category, however, the judges were more impressed with Robert Larson of Minneapolis, who won first to Brandon's second. Brandon and his partner, Fred Waidner of Northbrook, Illinois, took first place in the duet category. Milton Briggs, a speech therapist from Carmichael, California, was judged the best whistler overall, winning first in classical, third in contemporary and fourth in duets. In the women's division, Patty Ediger of Dayton, Oregon, won firsts in contemporary and classical and shared a third in the duet category with Art Carling of Ruth, Nevada.

"I started coming to these contests not mainly to compete, but to meet other whistlers and hopefully find someone who whistles like I do," Brandon says. "It's funny how all mankind can relate to a whistle—something that's as old as we are," he says. "I'd like to find out where it came from, and how far it can go."

Some indication of how far whistling can go is being provided by Ron McCroby, who, following Fred Lowery's lip prints, is now a professional whistler. McCroby has "puccled" in nightclubs and on concert stages throughout the United States and in Europe, appeared on the *Tonight Show* with Johnny Carson, the *Merv Griffin Show*, *PM Magazine* and other national television shows and recorded three albums, whistling jazz on two and classical music on the other. "That's the most fascinating thing I've ever heard," said an astonished Carson, after the first of McCroby's

By whistling from his throat, Ralph Giese can do the entire "Flight of the Bumble Bee" in four breaths.

five appearances on his show. "He could hold his own with any jazz instrumentalist in the country."

McCroby is a genial man in his early 50s, somewhat broader of girth and sparser of hair than he once was, with the kind of twinkle in his eyes that one expects of a whistler. He says he always wanted to be a jazz musician, but life made him an advertising executive. "You wouldn't believe the number of three-piece suits I have," he says, chuckling.

McCroby and his family live in Chagrin Falls, near Cleveland. He now divides his time between advertising and whistling. "I'm having an absolute ball," he says. Unlike many serious whistlers, he rarely practices, "although every morning when I get up, I whistle just to make sure it's still there." He coined and copyrighted a word to describe his "instrument": the Puccolo. He doesn't do much of anything special to protect it, other than the following: "I avoid violent kissing, I don't get smart with guys who are bigger than I am and I'm real careful when I go through revolving doors."

There are two kinds of people in the world: those who can whistle and those who have tried. Relatively few can be virtuosos, but anyone who can whistle can learn how to improve, according to Clifford Pratt, president of the International Association of Whistlers. He says the most important factor is proper breath control. Blowing too hard produces harshness; blowing too softly results in a breathy tone.

The most challenging thing about whistling, for the virtuosos as well as for the rest of us, is staying in tune. Pitch is controlled by variables such as breath, moisture and position of the tongue—all hard to control. "It's very difficult to fix the pitch when you're whistling," says Hassell. "With a trumpet, for example, you pick it up, press down a valve and that's your A. You can't do anything like that with a whistle."

There's no magic recipe for better backyard whistling. It's just one of those things that you have to fool around with for a while. It helps to breathe smoothly. The experts agree that practicing scales will improve your range. Low notes are produced by putting the tip of the tongue against the base of the bottom teeth; high notes by moving the tongue up against the roof of the mouth. To produce a trill or tremolo, the tongue creates a space behind the upper teeth and rapidly blocks and unblocks it while breath is exhaled. Advanced whistlers flutter their tongues for fluid trills.

Whether bad or good, in tune or not, whistling has its practical side. Clifford Pratt is working with a group of speech therapists to develop whistling techniques to help children overcome speech problems through improved breath control and tongue flexibility. People who have a piercing whistle have a clear advantage when it comes to hailing cabs, calling the dog or the children, or indicating approval during a sporting event. And if you're ready to leave the house and you can't remember where you put your keys, there's a key chain on the market now with a beep that can be activated by a whistle: you whistle and the key chain tells you where it is.

Furthermore, says McCroby, whistling is highly useful when walking past a graveyard. "No question about it. Keeps 'em all under there."

Milton Briggs, Grand Champion at 8th International Whistle-Off, wrote "Opus in A minor for Whistler."

At Whistle-Off, Barry Rector rehearses with cassette recorder. He has a range of almost two octaves.

BRISTLE-OFF

Santa Fe caboose rolls out of Barstow yard on run to Los Angeles, with conductor sitting in its cupola.

By Donald Dale Jackson

Cabooses may be rolling toward the end of the line

A conductor's 'crummy' was his castle, but soon, replaced by computerized sensors, it will be a home for railroading memories

Officially known as the Atchison, Topeka and Santa Fe, the line seeks to drop cabooses from all its runs.

An early caboose, on the New York, Ontario & Western Railroad, appeared on picture postcards in the 1890s.

Tom Cooke was a 21-year-old flagman for the Pennsylvania Railroad when he presented himself for duty one day in 1941 to a crusty old freight conductor at his caboose in the South Philadelphia train yard. "They told me that I'd recognize his caboose—we called 'em cabin cars on the Pennsy—by the curtains. Curtains! I found him, Roy Thompson was his name, and told him that I was his new flagman. He looked me over and said, 'Wipe your feet and come in.'

"I can still remember what it looked like inside. He had a linoleum tabletop and a coal box with copper sheathing on it and a rack on the wall for the coffeepot, all shiny copper. There was a carpet on the platform and screen doors and, yep, curtains. I've worked in some clean gigs but never like that. I couldn't get over it. He saw me gawkin' and said 'What are you looking at?' He said, 'I hope you have a home, because this is my home and I keep it clean. If you ride with me you do, too. Now have some coffee, but wash your cup when you're through.' "

George Washington Ballard has an equally vivid recollection of a trip he made as a brakeman on a Frisco Line freight between Ada, Oklahoma, and Sherman, Texas, in the 1920s. "Three of us were on the floor of the crummy, the caboose, shooting craps for a nickel a roll. We had the oil lanterns on the floor so we could see the dice as it was nighttime, and we were making a long uphill climb, going slow.

"All at once the whole caboose lights up and a whistle screeches. My heart went right to my boots. It was another train coming up behind us, but the engineer knew what we were doin' and he waited till he was right next to us to turn on the light and blast that whistle. He wanted to scare us. I thought I'd met my maker, it was the worst scare I ever had. When trainmen jump off a train they say they're 'joining the birds.' We were all ready to join the birds."

Caboose, cabin car, crummy, way car, van, ape cage, throne room, hack, buggy, the office, shanty, monkey house, bedbug haven—American railroaders have known the last car on a freight train by all these names and more. To the men who worked the back end of the train, conductors and brakemen and flagmen, a caboose was often an ever-so-humble home. Until the 1950s and early '60s train crews usually ate and slept in their cabooses when laying over at the far end of their runs. Caboose furnishings were and are bare-bones plain: a desk where the conductor does his paperwork,

Color photographs by Terrence Moore

New Haven caboose doubled as dining car for the crew, whose culinary arts competed with smell of coal.

Turn-of-the-century caboose was home on wheels for trainmen on the Southern Pacific's Tucson division.

a stove, an ice box and table, lockers, a toilet, benches that convert to bunks, and padded seats in the raised and windowed cupola where crewmen watch the boxcars for signs of trouble and return the waving of envious small boys ("You wave back so they won't throw rocks at you," a brakeman says).

I want to confess right now: I'm a sucker for cabooses. Something about them has always captivated me, ever since I was one of the kids waving eagerly beside the Southern Pacific tracks two blocks from my boyhood home in California. Maybe it's their toylike quality or their look of fragility and vulnerability, especially in contrast to the snorting beast at the front of the train. To a child, a caboose looks like a playhouse on wheels complete with porch and stovepipe and lookout tower.

But there is also a reassuring humanity about cabooses. They're made for people, not oil tanks or refrigerated containers, and they are cut to a human scale. Men in no particular hurry—unlike travelers on passenger trains—peer out from the cupola or slouch on the back platform. Cabooses look lived-in, inviting, somehow personal. They also look anachronistic and out of step with the times—doomed, probably, but quietly holding on as if hoping that no one notices. When I finally rode one a few months ago I was struck by how few visible signs of the 20th century I found within: a radio-telephone hanging from a looped string, a chemical toilet, and a small generator-powered refrigerator. Otherwise it could have been 1889.

My ride in Santa Fe caboose 999451 began in Los Angeles and ended six hours later in Barstow on the Mojave Desert. A narrow aisle divided the green-walled caboose, with a stove and padded benches on one side and lockers, a small desk and more benches on the other. The cupola, which spanned both sides of the aisle in the rear of the crummy, contained two venerable chairs elevated about six feet from the floor. The train, a little more than a mile long, clacked and clattered with a rhythm that felt Latin American to me—*one and two and three, click, one-two-three, la conga!* Rear brakeman John Ayre sat in one of the cupola seats and eyeballed the 67-car freight. Most of the goods aboard were being transshipped, he explained; they were Asian imports destined for South America or Africa by way of Texas.

Northeast of San Bernardino we began a long, slow uphill pull to Cajon Pass in the San Bernardino Mountains. Even with five diesel engines grunting on the front end our speed was barely more than ten miles per hour. Two teenage boys running beside the tracks drew abreast of us and then pulled in front before giving up. Construction workers raised their hands in desultory waves. "There's a bar up here where people some-

Donald Dale Jackson is a frequent contributor to SMITHSONIAN. *He last wrote on attempts to save primates from extinction, in the December 1985 issue.*

For a Christmas Eve run in this New Haven caboose, the brakeman and conductor brought their tree along.

times come out and throw rocks at us," Ayre said. "A little farther on there's a nudist camp. Be alert." When we passed a freight going the other way, Ayre climbed down and examined the cars on the other train from the rear platform; railroaders call this "rolling the train by." He and the brakeman on the other train exchanged "highball" signals that all was well. The nudist camp turned out to be disappointingly deserted.

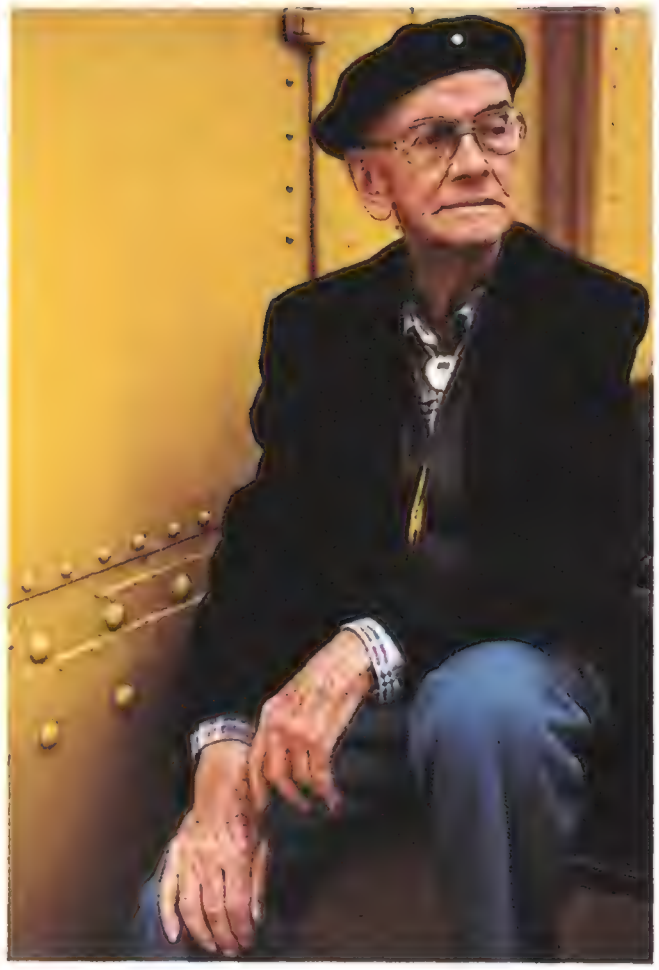
When another freight passed, Ayre pointed out that it was commanded by the railroad's senior freight conductor. "He's called 'Peaches,'" Ayre said. "The story is that he used to stop his train to pick peaches." Having crested the pass, we were now rattling along at good speed. "Hold on! We're gonna get some slack," conductor Lloyd Adams shouted. A few seconds later the caboose suddenly lurched when the engineer applied the brakes. As we rolled slowly through the yard at Victorville, a hobo appeared at the door of a parked boxcar and stared at us with bleary eyes. "We don't see those boys much anymore," Ayre remarked.

For a while our route paralleled the feeble trickle of the dry-season Mojave River, and then we were in Barstow and the trip was over. As we pulled into the freight yard we saw a long line of about 40 cabooses, painted the conventional, no-nonsense red, parked on a siding. The Santa Fe was storing them pending a decision on their future. They looked like a row of dignified, down-at-the-heels dowagers patiently awaiting their fate. "That's probably where they'll die," Ayre said, casting a nostalgic eye across the tracks.

Cabooses began their career on American rails with characteristic humility, surfacing originally at a time and place since lost in the smoke of history as either converted boxcars or shanties built atop flatcars to shelter the crew. It was probably in the mid-19th century because by 1889 the caboose was known well enough to be named in a lawsuit brought by a railroader in New York for injuries suffered in a "caboose car"—one entry in what would eventually become a century-long chronicle of caboose casualties.

Chicago & North Western conductor T. B. Watson claimed credit for the idea of the cupola. Watson said he was touched by inspiration when he was assigned to a car with a hole in its roof on a run through Iowa in 1863. Watson amused himself by sitting atop a pile of boxes and eyeballing the train and the landscape while protruding from the roof, an experience so gratifying that he persuaded a C&NW mechanic to add cupolas to the cabooses then being built. Cupolas have remained popular with trainmen ever since, though some lines later switched to bay-window viewing posts on the sides of the cabooses.

By the late 19th century the caboose had unceremoniously evolved into the freight train's nerve center. It was the command post and office for the conductor, who kept track of the documents for each freight car in his train and who bossed the train despite the sometimes ornery objections of the higher-



Retired B&O Railroad conductors John Dove (left), John Bragg, visit Ohio train yard where they worked. George Ballard (at right), now 81, finds caboose in a museum; he worked as Santa Fe conductor for 27 years.

paid engineer or "hoghead." The rear brakeman sailed forth from the caboose to scramble across the tops of boxcars to set handbrakes. Crewmen watched over the train from the cupola for overheated axle bearings—"hotboxes"—that could cause a derailment. The flagman moved down the tracks behind the freight to signal following trains during unscheduled stops. Supplies were stored in the caboose, meals cooked and consumed there, card games played when the coast was clear and a flask sometimes cracked open and shared in defiance of the railroads' uncompromising "Rule G." The engine got most of the attention, but the "little red caboose," which was also brown, green, blue or yellow, was where the action was.

The changes came gradually, at first. The two-axle, four-wheel cabooses grew two more axles and four more wheels. Handbrakes were replaced by air brakes, link-and-pin couplings were replaced by less hazardous "knuckle" couplers. The velocity of change increased after World War II, when retired railroadmen now in their 60s and 70s were just hitting their professional stride. Steam engines phased out and diesels came in. Wooden cabooses gave way to steel models. Automatically activated signals all but eliminated the need for flagging. Radio-telephones appeared in cabooses, permitting direct front-to-rear communication. The hardest change for rear-end railroaders to accept was the abolition of individually assigned cabooses. Beginning in the 1950s, the railroads shifted to "pool" cabooses shared by dozens of crews. Roy Thompson of the Pennsy could no longer decorate his cabin car as he wished because it was no longer his alone. Individuality disappeared and sometimes pride did, too.

Cabooses edged closer to extinction in recent years as technology chipped away at their role. Computers took over the conductor's record-keeping work. An electronic "end-of-train device" now monitors brake pressure, which was traditionally one of the rear brakeman's jobs. Trackside scanners, installed at intervals on many lines, can now detect overheated axle bearings, and report the problem to the engineer—in a computerized, sometimes female, voice.

The Florida East Coast Railway uncoupled its cabooses for good in 1972. Ten years later an agreement between railroads and the United Transportation Union sanctioned the elimination of cabooses from about one-fourth of all through-freights plus most local trains. The surplus crummies were rolled onto storage tracks around the country. The caboose became an endangered species.

The railroads, citing their obsolescence as well as savings in costs, want to derail all cabooses permanently. "From an economic and safety standpoint," Santa Fe executive Homer C. Henry says, "they're museum pieces. They've outlived their usefulness." The union contends that they are still needed for safety, that caboose-mounted crewmen can spot derailments and grade-crossing accidents that would other-

wise be missed. "One big accident might save them," says a retired union official. "Then everyone would realize we need them." Four states have laws that require cabooses on trains within their borders. Many more states have rejected such legislation.

Disagreement will no doubt persist, and so will cabooses, at least for a while. But they are clearly approaching the end of the line. Grave dust is gathering on cupola windows. Cabooses will ultimately survive, but as boutiques and motel rooms and museum exhibits, not as train cars.

I had a chance not long ago to talk to a number of retired railroadmen who spent their working lives on the hind end of freight trains. Many of them still live in junction towns and small cities not far from the sprawling rail yards that beckoned them as youngsters. Not surprisingly, these men unanimously opposed the elimination of cabooses—"You can't replace the human element" was a recurrent refrain. Cabooses were part of their professional identity.

But what surprised me was their absence of anger or bitterness. For the most part these were men who enjoyed going to work each day. Railroading was lively, variable enough to be interesting, the hours were refreshingly irregular, the pay was good, the fellowship was bracing. "I'd be there yet if they'd let me," 71-year-old John E. Bragg of the Baltimore & Ohio told me. "Hell, they had to drag me off."

They talked about the hardships and pain of rear-end railroading and of its singular pleasures, the spasms of fear and disaster along with the quiet satisfactions. When they spoke of the cabooses where they lived and worked they seemed to be reminiscing about old, slightly eccentric but lovable friends.

Many conductors found ways to stamp their caboose as their own. "On the New York Central we each had our own marker on the roof," Dennis Morgan recalls. Morgan was a conductor on the Syracuse-Buffalo run. "We made them out of wood or metal, they were like brands. Mine was a T; I put it on the end of the cupola. Others had triangles or crosses, one guy had a lantern made from sheet metal. You always knew who was going by." John Bragg painted the inside of his caboose green and yellow. "You bought your own paint and you kept that number on the outside clean. When they saw that shiny number 1963 they knew it was me."

The most popular nickname for cabooses among railroaders was "crummy," and Ed Beaver of the Reading Line says that the word often fit. "They were uncomfortable, dirty and smelly—they smelled of kerosene smoke and coal. There was dirt in the paneling and the cushions, and cigarettes on the floor. We had one-hole toilets when I hired on, you'd go right on the tracks. In the summer it could get to 115 degrees inside and you might sit on a siding for an hour in that steel box, and in the winter the back end of the caboose never got any heat. You'd put all your clothes on to sleep and lots of times you'd still sit up all night."

Good food, however, could make up for a plentitude of grime. Though the standard fare prepared on the coal (later oil or electric) stoves ran to redundant beans and stew, the exceptions were sometimes memo-

Jack Beaty (left) hangs on to red, white railroad lamps he used in his days as conductor on Western Pacific. Ed Beaver, with homemade model railroad platform, holds miniature of his old Reading Line caboose.

For cabooses, the end of the line

As Santa Fe engine pulls into Barstow train yard,
rows of red cabooses stand parked on the sidings.

rable. Bob Gill, who worked the Pittsburgh division of the Pennsylvania, loved to cook. "I'd make pan-broiled beef and roasts cooked in foil on top of the stove," he recalls, "and pancakes for breakfast. I'd take a shopping bag with me with pans and paper plates and condiments. I called it my commissary.

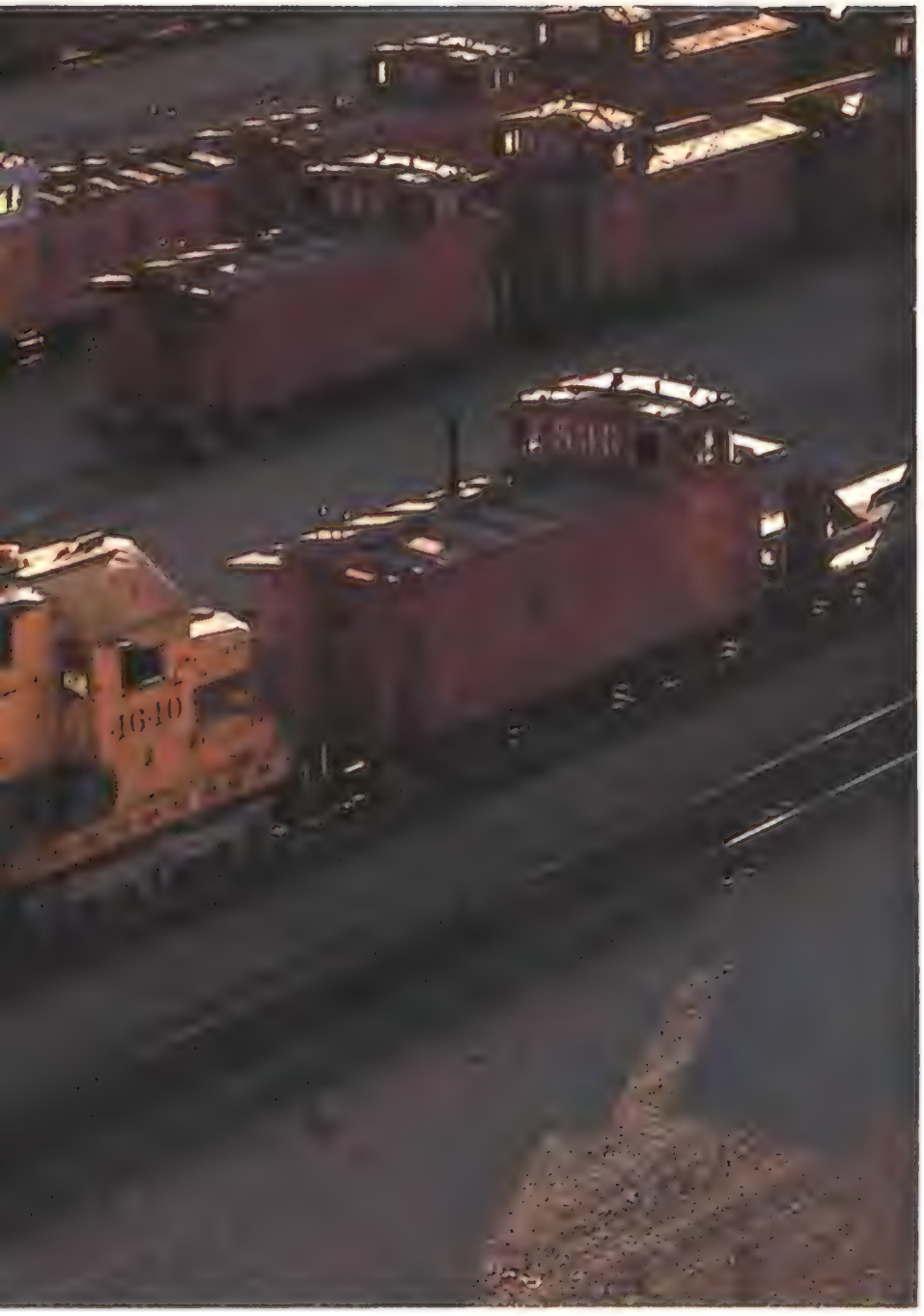
"One New Year's Eve I was going east from Pittsburgh and I wanted to make something special, so I fried oysters and fish fillets in butter, wrapped in foil. Oh, it was delicious! I guess I can tell you—they can't get me now—that we had a little bottle of champagne, too. It was really just the idea of it because for the conductor and me—we both liked a drink—that was just a drop in the bucket."

Jack Beaty, whose regular run on the Western Pacific in California included the dramatic Feather River Canyon in the Sierras, remembers a caboose breakfast that was nearly undone by mountain railroading. "We were chugging up to the pass and the brakeman whipped up a cheese omelet. Well, there was a rock-slide on the track and the engineer went onto the 'big hole' (applied the emergency brakes). That omelet jumped out of the pan onto the floor, which we hadn't cleaned in a while. The brakeman looked down and said, 'I'm hungry enough I'm going to dust it off and eat my share.' The conductor thought a second and then he did too. I was flaggin', I said I'd go along with my conductor and I ate the rest."

The confined, utilitarian caboose offered few opportunities for diversion, but dogged funseekers made the best of it. Dan Reilly of the Santa Fe specialized in practical jokes and nicknames. "When we were on a siding once I lit a fire under the bunk where my brakin' partner Jelly Belly Osborne was sleeping. I did this only to observe, you understand. I observed that he became quite agitated. Another time I wrapped a dead snake around a switch handle I knew he'd pull."

Reilly favored physically-descriptive nicknames. "Chromedome Rourke was lacking in hair, Paddlefoot Irwin had huge feet and Toad Carlock was short and fat. We called one guy Ratface Walker, and there was Mad Anthony McNamara and Tippy Toe Jenkins. A guy with part of his foot cut off was called Halfstep. They called me Depot Dan or the Deacon because I'd sometimes wear a derby and a swallowtail coat and white gloves on the switch job, just for the fun of it."

Women on cabooses were a no-no, even when trainmen were off duty and overnighting in a foreign yard, but they were not a never-never. George Ballard, a brakeman who worked for the Frisco Line in the Midwest and later for the Santa Fe in California and Colorado, remembers a conductor who periodically evicted him from their parked caboose when his lady friend was visiting. And Bob Gill of the Pennsy tells of one train crew that invariably needed 14 hours to complete a ten-hour run. On investigation it turned out that they were parking on a siding and passing the extra time heterosexually. "Personally," Gill adds thought-



They are stored here pending a decision on their fate—"probably where they'll die," a trainman says.

fully, "I never found a caboose a very romantic place to entertain."

There were other occasions when the demands of the job forced a man to abandon the cozy sanctuary of the caboose without knowing when he would return. A blizzard, for example, could back up rail traffic and make a flagman long for the crummy's scant comforts. "I was flagging on a freight out of Piedmont, Ohio, one stormy night when there were two trains stopped ahead of us," John Bragg recollects. Bragg worked on the Akron division of the Baltimore & Ohio. "There was a passenger train about an hour behind us and I had to stop it. The snowflakes were like half dollars. I had to mush through belly-high snow for more than a mile. Had to lean into it to make any progress.

"I found some coal and timbers and made a bonfire. I didn't have any food or water but I ate snow. I was out there more than 17 hours, from 8:30 at night till 2 the next afternoon. I was protecting my train, you know. That passenger train never did come, it was snowed in up the line. The yard engineer told me later that they'd come lookin' for me but not far enough, so they gave me up as froze to death."

Relations between the front and rear of the train, between the glamorous engineer at the controls and the invisible conductor-commander in the caboose, were often as bumpy and jarring as an old railbed. "There was always a rivalry between engine crews and caboose crews," John Dove of the Baltimore & Ohio acknowledges. "You were natural antagonists. The engineer thinks, 'I work my butt off and he's sitting back there taking his ease,' and the conductor says, 'I'm out in 20-degree weather and he's up in the warm engine.' " Conductors enjoyed pointing out that a "hoghead" could not move his $300,000 locomotive until a conductor waved his $2.35 lantern.

"A good engineer kept you alive"

Tom Cooke of the Pennsylvania's Wilkes-Barre division recalls that the touchiness and tension sometimes extended to the railroaders' wives. "There was a pecking order among the women," he says. "A passenger-engineer's wife was tops, then a passenger conductor and trainman, then a freight engineer and conductor with firemen and freight brakemen at the bottom. We called the engineer 'The Big E,' and sometimes they wouldn't mingle with us; they stayed at the other end of the bar. But I got along with lots of them, too. A good engineer kept you alive."

The men in the caboose felt a genuine affection for some of the people and places along their runs; they preferred to highball past other locales as fast as possible. "There were people who always waved, or at night they'd flick a porch light on or wave a lantern in the barnyard," John Bragg remembers. "I believe that's gone now. We'd look for that, look forward to it. We never knew them, but we'd give them names like Mabel and Harry. It was just a friendly gesture. If you didn't see them you'd wonder what happened. You'd see the kids every year and watch them grow up." In the steam days, trainmen sometimes shoved coal overboard in poor neighborhoods. Dennis Morgan of the New York Central can close his eyes and see the kids he used to throw hard candy to in upstate New York.

Missiles often flew the other way as well—cabooses could be a temptingly slow-moving target—and sometimes they connected. "I was on the back platform in Wilkes-Barre once and a rock the size of a golf ball hit me between the eyes," says Tom Cooke. "I saw a flash of light and for a second I thought I was electrocuted. It knocked me into the back door. I was mean for a while after that. A kid hit me with a potato and I stopped the train and chased him with a brake club for a half mile. Lucky I didn't catch him."

Almost every old railroader remembers at least one town where caboose crewmen flattened themselves against the wall away from doors and windows. Sometimes trackside desperados went to diabolical lengths. A cement block lowered on a rope from an overpass smashed a window on Bob Gill's buddy's train in Altoona, Pennsylvania. Dennis Morgan's freight had to halt in Buffalo several times to clear away junked refrigerators and washing machines piled on the tracks.

Every caboose jockey I met professed tolerance for the hoboes who often shared their trains. "I'd give them four bits and some tobacco and let them get off before we got to a town," Jack Beaty of the Western Pacific says. "They just wanted to get somewhere. I'd see them when we'd lay over in Oroville and they'd have a bottle or groceries. Sometimes they'd spot a hotbox when we were on the road." Still it could be unsettling, as Clyde Randall of the Southern Pacific discovered, to encounter them in carload lots. "We'd go close to the Mexican border, and illegals would jump on and ride to L.A. I got on a gondola car and there were 50 of them. I was wondering if they were going to kill me, but they just opened a path and let me pass. They didn't say a word and neither did I."

On one trip, Ed Beaver of the Reading Line was startled to see the handle turn on the door to the cabin of one of his train's engines. The engines and caboose were normally off-limits to freeloaders. "I opened the door and there was this guy. I said 'What the hell are you doing?' and he said 'Going to Harrisburg.' I told him 'I didn't see you and I don't plan to see you in Harrisburg.' I didn't." The Santa Fe was hard on non-paying passengers. "They'd tell us to 'clear the train,' " George Ballard remembers, "and I'd go down the line and pretend I didn't see 'em. They didn't bother me. They were supposed to stay out of sight. I told one guy who was sitting on the running board of a tank car to get inside. He told me to go to hell; and when he took a swing at me I believed him. I was obliged to literally kick him off."

Anyone who rode a caboose learned to recognize the telltale hiss that signaled the application of the emergency brakes—"It was a dead, dull hiss," John Bragg says—because when you heard it you grabbed anything in reach. When the slack that accumulated between the cars of a long freight "ran in" it packed a wallop that could hurl a man the length of the caboose. George Ballard saw a friend break his neck that way, and Carl Miller decided to retire from the Southern Pacific about six minutes after suffering his worst slack-induced accident. "I was getting up from the desk and it threw me over the arm of the chair.

At start of his career with Santa Fe, 22-year-old Dan Reilly works on engine's footboard as the engineer backs it up in Antioch, California, yard. At right, almost 50 years later, a retired Reilly holds the red flagging lamp and brake club he used during 40 years of railroading.

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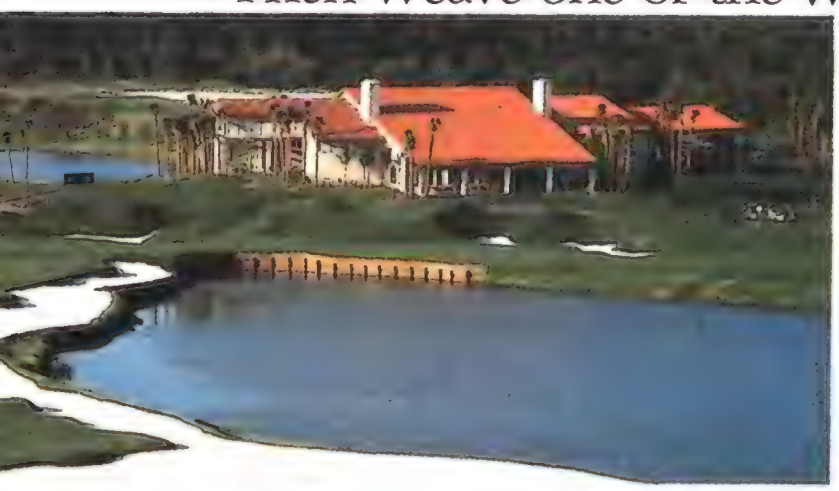

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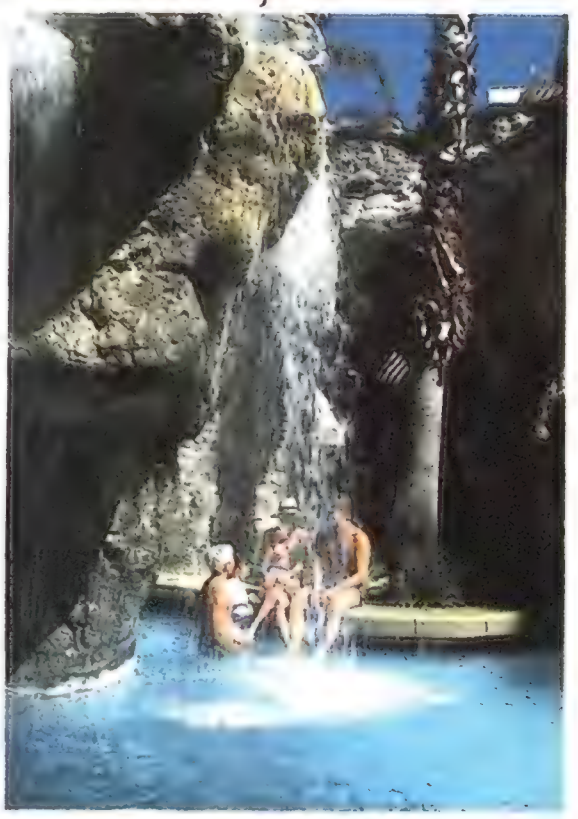

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It felt like I broke several ribs. You hear about famous last trips. Right then I said to hell with it."

But when a train derailed or collided with an automobile there was usually no warning, and the risk of death or serious injury was greater. "My train smacked into a car while going about 40 miles an hour once in Lebanon, Pennsylvania," recalls Ed Beaver. "The slack came clacking in, everything banged together. I was thrown all the way down the caboose and smashed against a steel wall. I came to after a while and stumbled off, then fainted next to a shanty beside the tracks. Turned out I dislodged three vertebrae and I was out nine months." Jack Beaty was a little luckier: "The worst of it is when there's a derailment and you're going too fast to jump. The car just ahead of my caboose derailed one time in the mountains. The conductor and I finally jumped onto the ties and rocks behind us, and he landed on top of me. We both got cut up, but the caboose stayed on the tracks."

The nightmare that rear-end railroaders dreaded most was being pinned between two cars while working on the couplers. Carl Miller witnessed such an accident. "I saw a guy get his body caught in the couplers like a vise. He asked me to get his wife. The pressure must have kept him alive somehow, because as soon as they got the cars apart and pulled him out he collapsed and died."

Despite the hardships and dangers, the men who rode in the caboose look back on their work with pride and affection. They were content with their lot. "I enjoyed it so, I couldn't wait till it was time to go back, I really couldn't," John Bragg declares. "I never had another job and never wanted one." "To me there was nothing like railroading," Carl Miller says. "I was born to it—hell, I never had a train ride until I was six weeks old. To an extent you were your own boss. And no two trips were ever the same, the way that the light on the desert never looks the same."

And there was something more as well, something that makes the extinction of the caboose even harder for these men to accept. It was more than sentiment. It was the conviction that their work was important, that they were doing America's business. Jack Beaty struggled to articulate the unpretentious pride that they all felt: "You could say there's a romance to railroading. It's the feeling that you're handling millions of dollars' worth of equipment going all over the country. It goes like a poem: the freight is shipped from New York, delayed in Chicago, laid out in Winnemucca and due in Oakland. And you have to make the connection so it gets to Oakland. I'd have four men to run all this equipment and I'd think, by God I'm kind of a halfway important person. I don't know how to explain it—your wife is mad at you, the kids are breaking things, but you get out there in the caboose and all that's left behind and you're doing something important and it fits in with the country, you're important to the country, and people respect you and listen to you."

Jack Beaty's pocket watch, bought in 1949, kept his Western Pacific crew and trains on time for 25 years.

Santa Fe freight rolls over California's 3,800-foot Cajon Pass; cabooses may not make run much longer.

By Dora Jane Hamblin

Riches and relics of Ottoman sultans dazzle at Topkapi

Six centuries of treasure and scores of legends are contained within the maze that constitutes Istanbul's famed palace

At confluence of the Golden Horn and Bosporus, Topkapi's harem looks out toward modern Istanbul.

Octagonal towers on jumble of roofs are chimneys of harem; the square ones mark baths of the sultans.

Quite a lot of people had never heard of the Topkapi Palace Museum in Istanbul until a 1964 movie about the theft from its premises of an emerald-encrusted dagger. It was a pretty forgettable film, except for the performances of three European stars: Greece's Melina Mercouri, Switzerland's Maximilian Schell and Britain's Peter Ustinov. There were some fine scenes of the delicate theft, of Mercouri staring straight at the camera and saying "I am a thief," and a nice fade-out with Mercouri and Schell, two rascals you have come to love, plotting a future heist through the grille that separates their prison exercise yards.

Well, film lovers, the dagger is still there in the museum and it's the real one, not the fake of the film. But it, like the Leaning Tower of Pisa, does a disservice to its surroundings: there are greater glories nearby. On view are everything from gem-encrusted Koran covers to richly illuminated manuscripts to all manner of exquisitely worked jewelry. An intricate Indian music box with rotating scenes is topped by a gilded solid silver elephant. There are richly embroidered velvet, taffeta and gilt brocade caftans once worn by the sultans, all superb examples of Turkish textile weaving. And the thrones—thrones of gold and jewels, of walnut inlaid with tortoiseshell and mother-of-pearl, thrones with jeweled cushions, vaulted baldachins and quotations from the Koran set in gold.

The museum's collections represent holdings of the 25 Ottoman sultans who, for nearly 400 years, ruled their empire from the sprawling palace of Topkapi.

Photographs by Ara Güler

Head of Privy Chamber, sword bearer, aging Süleyman were portrayed by Nigari, the leading court painter.

Some of these items were created especially for the sultans, some were spoils of war, some were the extravagant gifts of neighboring potentates who hoped thereby to head off disaster.

Perhaps the greatest of Topkapi's sovereigns was Süleyman I, who ruled from 1520 to 1566. He led 13 victorious military campaigns and acquired so much territory, booty and renown that the West has known him as The Magnificent. In his own country he was called The Law-Giver. An enlightened sovereign for his time, he regularized the civil and military administration of the nation, making the system more efficient; encouraged the arts and literature; and actually eased the strictures on non-Muslim subjects of the realm. In Süleyman's day the Ottoman Empire stretched from Baghdad in the east to Algiers in the west, from lower Egypt to the southern border of old Russia. Its navy dominated the Mediterranean, and Süleyman brought troops to the very gates of Vienna in 1529.

The famous dagger itself perhaps was designed as a potentate palliative, a gift for Nadir Shah of Persia. But in 1747, while Ottoman envoys were en route to Persia to deliver it, the Shah was killed in an uprising, so the messengers sensibly took the dagger back home. Also displayed are the diamond-encrusted chain-mail armor of Mustafa III, an 18th-century gold hookah or water pipe, solid gold candelabra, gems big as hens' eggs, and the gold-on-silver cradle in which newborn princes and princesses were presented to the sultan. The collections of Topkapi are the finest extant examples of Ottoman taste and riches, and so dazzling to Western eyes that a few years back an American member of an aid commission to Turkey reported that the country didn't need aid. He had seen Topkapi, he said, and "they're richer than we are."

Or at least once they were. The essential plan and layout of the vast 175-acre palace complex, perched on a promontory overlooking the Bosporus, the Golden Horn and the Sea of Marmara, were worked out between 1459 and 1465 to the order of Sultan Mehmet II, the young Ottoman who in May 1453 had conquered the Byzantine city of Constantinople by breaching its land walls. His first palace was built on a small hill a bit northwest of the spot all previous conquerors had chosen: the acropolis at Saray Burnu where Greeks had established a settlement in the seventh century B.C., where Persians and Spartans and Athenians and Macedonians battled over the centuries, where Romans conquered, where Constantine established the Eastern Roman Empire in the fourth century and changed the name of the city from Byzantium to Constantinople. Later came assaults by Huns, Avars, Arab armies, Bulgars, Russians, Crusaders and then, finally, the Ottomans. By the time Mehmet II took the city, the acropolis and the great buildings of Constantine lay in such ruin as to be uninhabitable. But within a few years the charm of the location and its defensibility seduced the sultan. His new palace on the promontory took its present name, Topkapi, from the Turkish for "cannon gate," a twin-towered gateway then facing the sea, flanked by two cannons.

The author, a frequent contributor, wrote about olive oil in the March 1985 issue of SMITHSONIAN.

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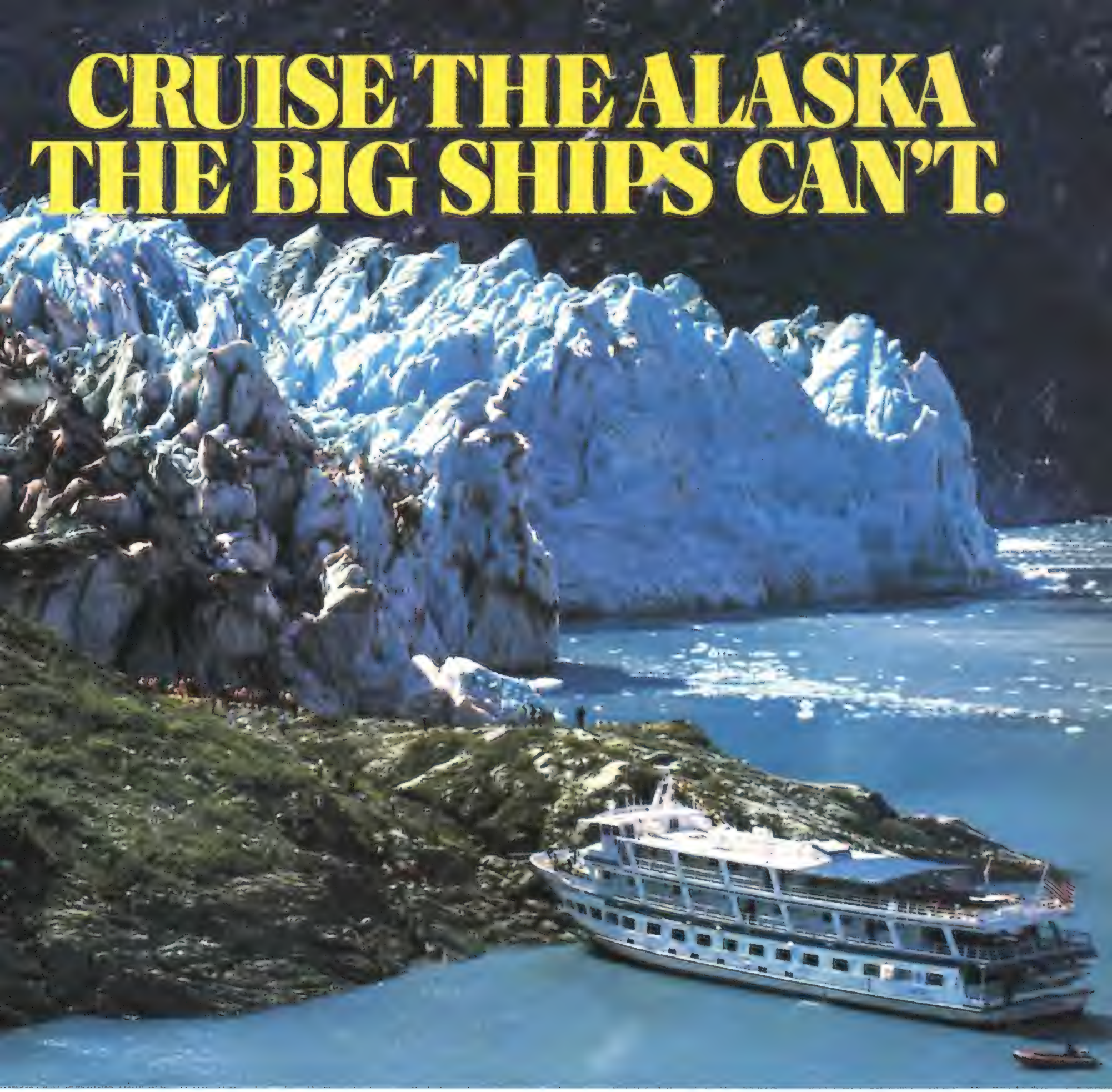

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Artists were barred from harem; a European did imaginary portrait of Roxelana, "The Joyous One."

Here he established the court, the Divan or Imperial Council, and the Palace School to train administrators —the viziers and accountants—for his empire. The famous Janissaries, Christian youths conscripted at a tender age, became the elite troops of the sultan's infantry. Mehmet kept his wives and concubines in the old palace and conducted official business from the new one. Within a century, however, the imperial harem was expanded at Topkapi by Murat III, who ruled from 1574 to 1595. The buildings, passageways and courtyards were enlarged and reconstructed through the years until they became a palace within a palace with more than 300 mostly small rooms on several levels. The harem—the word means a private or secluded place reserved for the sultan—then became the sultan's living quarters and those of the most important person in the harem, the sultan's mother, the *Vâlide*.

Here also lived his concubines, the black eunuchs who were guards of the harem ladies, and the female slaves. There were elaborate marble baths and latrines, a swimming pool, a hospital and quarantine room, a school for the crown princes, and a dungeon for the indiscreet. There was also a series of rooms for the sultan's brothers, who were kept in more or less benign confinement to frustrate plots against the ruler. Confinement seems a bit harsh, but it was better than what had gone on before: when Murat III died in 1595, all but one of his 20 surviving sons were murdered to ensure the accession of Mehmet III.

The harem, once the West was apprised of it, began to weave exotic and erotic dreams in practically everybody, including painters from Ingres, Delacroix and Gérôme to Renoir and Matisse. (The first time I saw the place, in 1950, a balding city guide accustomed to herding GIs around the premises kept launching himself on lurid harem stories and then, realizing that on this day he had three respectable Midwestern young ladies in tow, would color to his eyebrows, mop his face and mumble, "Let's pretend we're all doctors.")

Nowadays there is little in the harem to titillate, and most of its rooms are closed. Still visible are the grand audience hall, where the sultan and ladies of the harem were entertained, and the domed salon of Murat III, the most splendid room in the harem. It was designed by Sinan, the chief architect of the realm, greatly respected by Süleyman and the man who also created the magnificent Sülemaniye mosque, Ottoman architecture's greatest achievement. For the salon of Murat III, Sinan sheathed the walls with tiles from Iznik and further decorated it with an elegant bronze chimneypiece, a calligraphic frieze and a cascading fountain. Fountains abound in the harem, designed not only to please the eye but also to deceive the ear—a discreet 16th-century antibugging device.

Just how many concubines and slaves were housed in the harem nobody really knows. Ilhan Aksit, former director of Turkish national palaces, has written that in the mid-18th century the sultan had a nonspecific number of concubines. The crown princes had 19 maidens "at their service" and the sultan's mother had 20 maids. Aksit says that Süleyman had 300 slaves in his harem and Mehmet the Hunter 700.

The bewitching Haseki Hürrem

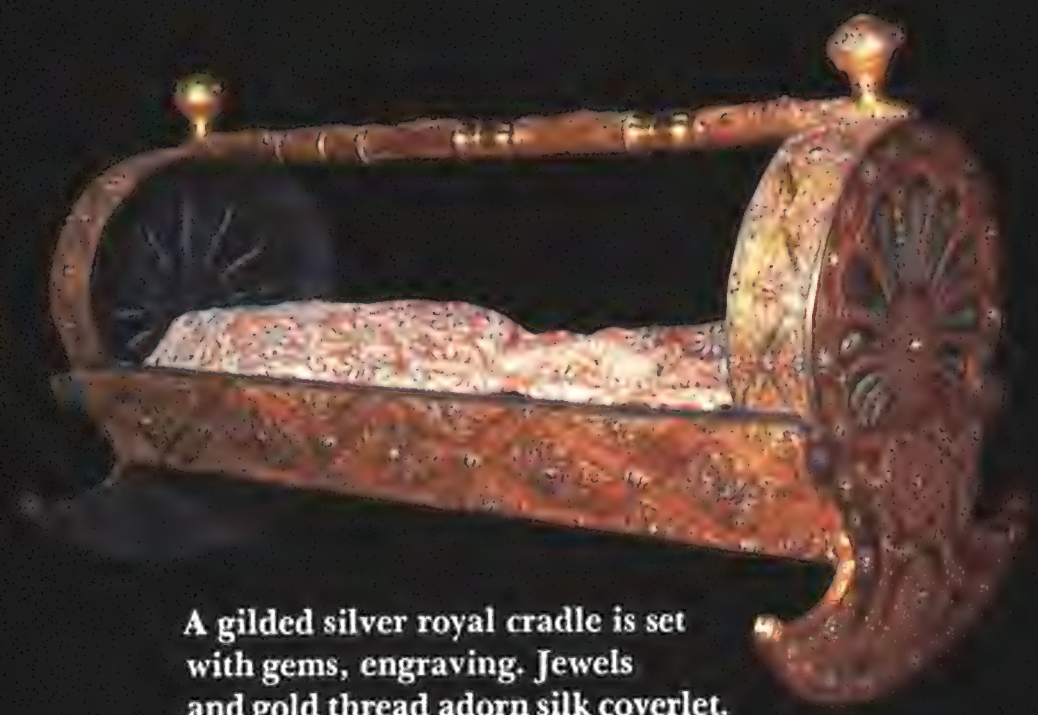
Still, the harem was not quite the den of licentious slavery the West has imagined. Turkish historians say that the concubines were girls selected meticulously as gifts from conquering generals and regional governors, and that they were educated from childhood in music, literature and courtly ceremony. The sultans chose women to bear their children, and lesser concubines as well, from this pool of captive talent, thus enabling the sultans to avoid the entanglement of marrying into local families of royal blood. After some years of service, says Aksit, the concubines were free to leave, either with a pension or with an arranged marriage. Many preferred to stay on, hoping to curry favor with the sultan for their offspring. The infighting must have been horrendous.

They had a stunning example, however: Süleyman's

"Which tie should I have worn with this Blazer, my dear?"

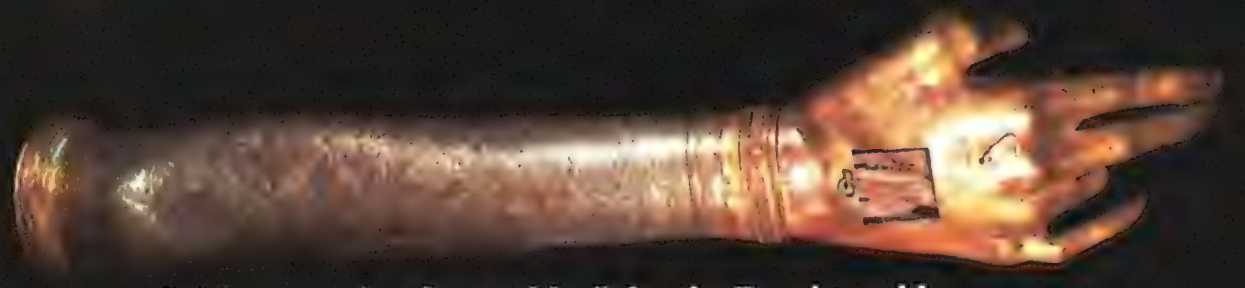
GM

Let's get it together buckle up.



A gilded silver royal cradle is set with gems, engraving. Jewels and gold thread adorn silk coverlet.

Sparkling with g
rubies, emeralds
a jade mug typif
Turkish design
in the 16th centu



Said to contain a bone of St. John the Baptist, gold reliquary is among Byzantine objects in the Treasury.

Pearl figurine of sultan under gold-tasseled canopy was a gift to Abdülaziz from devout Indian Muslims.

Enameled, bejeweled golden watch measures nine inches across. It was crafted in the 17th century in Ottoman Turkey.

favorite was a young concubine of Polish or Russian origin called Roxelana in the West but, in the harem, Haseki Hürrem, "The Joyous One"(p.116). Captured in war, she was presented to the sultan and became the classic power behind the throne. Not a raging beauty, she bewitched the conqueror by her intelligence, her skill at intrigue, and some smashing love letters with which she may have had the help of an amanuensis. Sample: "My soul, my sultan, sun of my state, treasure of my bliss, my heart burns with your absence, I beg you to free me from this longing, this sea of waiting . . . ." Roxelana was not admired universally, however. So clever was her conniving that she persuaded Süleyman that his eldest son was plotting against him and should be executed.

At the height of Topkapi Sarayi's existence, the 17th-century writer-traveler Evliya Chelebi said that it comprised 40,000 persons, certainly a city in itself. Many

Rock crystal decanter, ablaze with rubies and emeralds, has twin gold pouring spouts, testifies to the artistry of Turkish jewelers.

Hilt of renowned dagger is set with enormous emeralds. On gold scabbard are diamonds surrounding an enameled basket of flowers.

Diamond ahoy! Fisherman, one tale goes, exchanged it for three spoons. Surrounding its 86 carats are 49 fine stones.

Sumptuous Koran cover is thought to have belonged to Sultan Murat III; it is gold set with jewels and jade.

Pewter jug displays Turkish penchant for filigree gold; it twines among encrustations of rubies and turquoise.

of them no doubt worked in the First Court, a vast enclosure that was open to the public and also housed a bakery, the mint, an arsenal, and dormitories for guards and servants. Straight ahead is one of the gems of Byzantine architecture, the domed red-brick Church of St. Irene, destroyed by fire, then rebuilt by Justinian in the sixth century. Repaired and converted into the Royal Armory by the Ottomans, it now houses exhibits and chamber-music concerts.

It is to Chelebi that we owe a singularly vivid portrait of Murat IV, the lusty warrior who restored the prestige of the army, defeated the Persian Shah and retook Baghdad from the Safavids. Chelebi's description of a rapacious and cultivated sovereign gives an intriguing glimpse of Murat's wanderings outside the bounds of Topkapi. "Cruel and bloodthirsty as he was," reports Chelebi, "he was fond of conversing with rich and poor alike. He used to go his rounds in dis-

In 1720 a merry 15-day festival with gifts, banquets, fireworks, marked circumcision of four sons of Sultan Ahmet III. In this miniature the sultan, upper left, and courtiers watch dazzling overwater exploits.

guise so as to inform himself of the state of the poor and price of foodstuffs, for which purpose he used to go into cookshops and dine incognito."

The museum entrance is through the impressive Middle Gate with octagonal towers, leading to the Second Court. In the northwest corner is the handsome chamber of the Divan, the council which met as often as four times a week to deal with administrative and judicial duties. On ceremonial occasions it would assemble in the courtyard, clearly designed to accommodate the elaborate panoply of the sultanate. Into the array of magnificently dressed officials, palace guards and Janissaries the sultan would emerge, to sit on his golden throne. There would be 5,000 people on hand for these occasions, 10,000 when there was extraordinary business or the reception of a foreign ambassador. Foreigners were normally welcomed first by the Grand Vizier, then clad in heavy caftans before being presented to the sultan. These elaborate robes, gifts from the ruler, were a mark of great honor.

But the primary attraction of the Second Court is the series of palace kitchens, designed by the same Sinan in the 1570s, ten enormous halls crowned with domed and cone-shaped chimneys. Here were provided 4,000 to 5,000 daily meals. Each kitchen served a different clientele: one the sultan, one his mother, one the eunuchs, one the harem ladies, another the members of the Divan. Food was prepared in enormous bronze cauldrons and delivered by relays of slaves. One source lists kitchen help as including "17 butchers and butchers' apprentices, 23 yogurt-makers and milk handlers, 31 vegetable handlers, 17 chicken handlers," along with six people charged with providing ice and snow for cooling summer drinks, and 27 to make candles. Today the kitchens house the collection of Oriental ceramics. The Chinese collection, including Süleyman's treasured porcelains, is surpassed, say experts, only by those of Beijing and Dresden. It is heavy on blue-and-white porcelain, with a good lot of celadon, the greenish ware made famous from about

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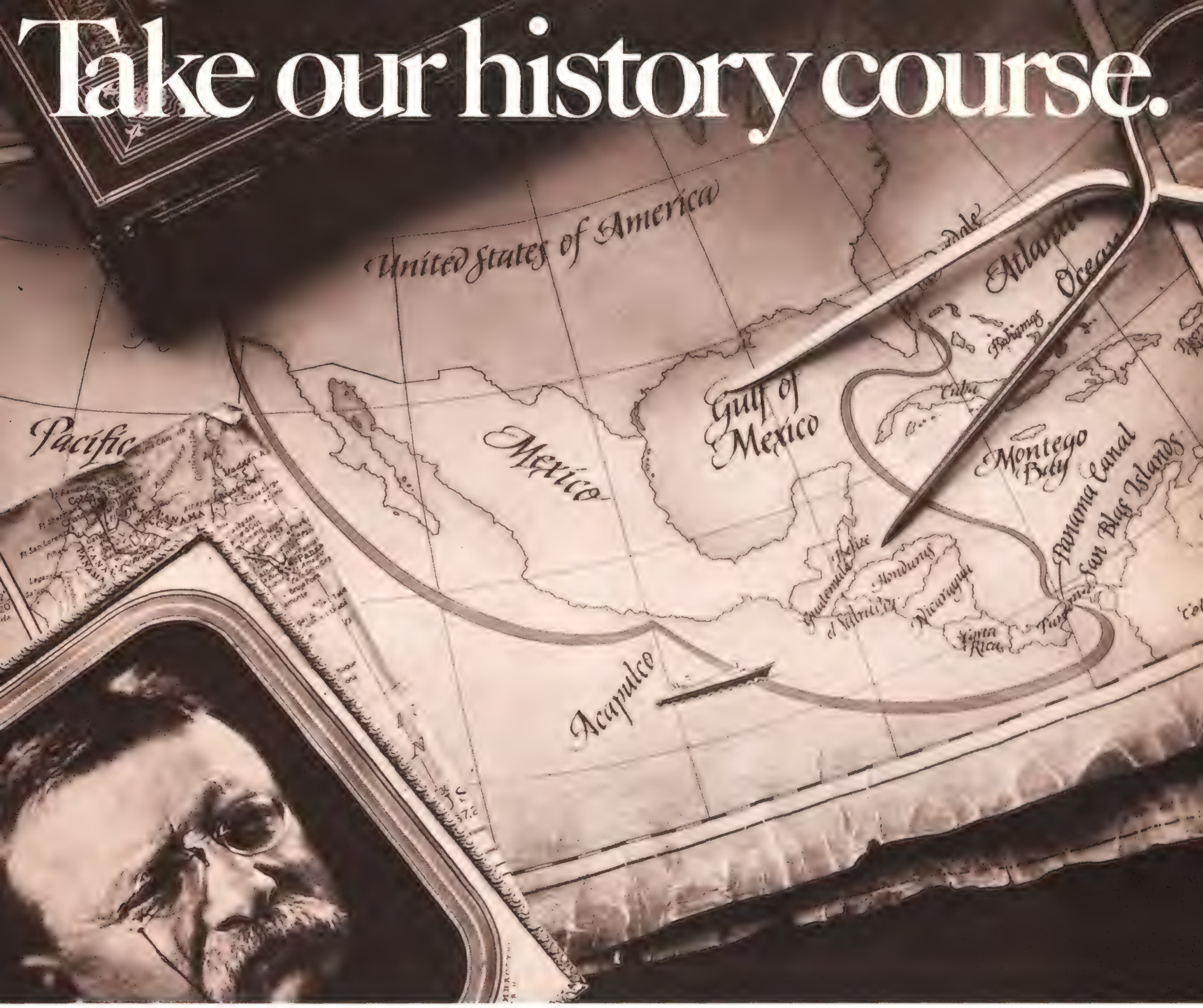

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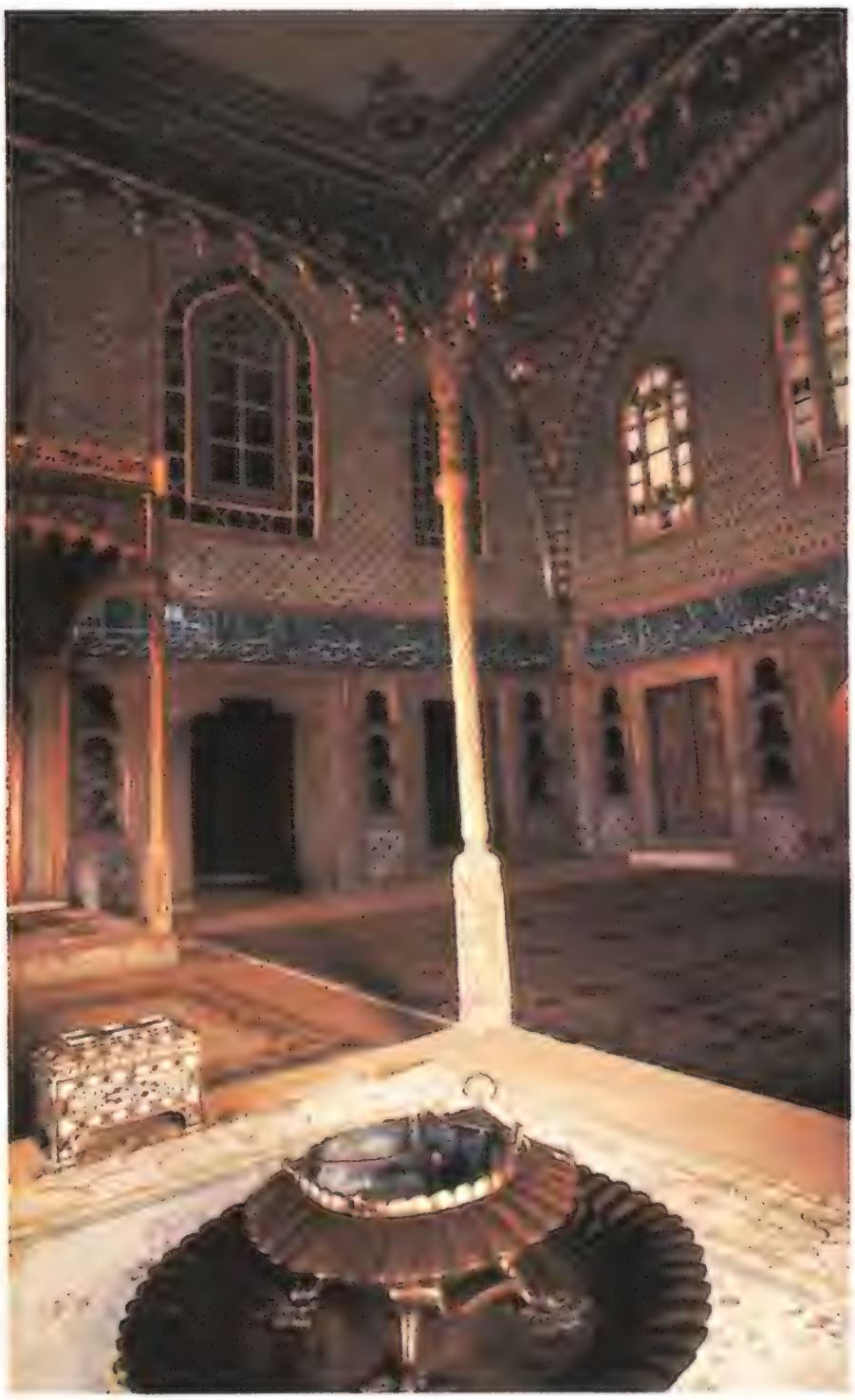

In bedroom of Murat III, lavishly tiled and carved, are Ottoman mullioned windows and bronze brazier.

A.D. 960 to 1370 and favored by the sultans because poison, it was believed, would alter the color. It is a fabulous collection, but to some tastes the best of the kitchens are the ones left as they were, with great fireplaces, bronze cauldrons, trivets, bellows, gigantic ladles and platters, all the evocative equipment of a now-antiquated food-producing machine.

In the northeast corner of the Third Court, installed in four chambers which were once residences and classrooms for the students in the palace school, is the Treasury of Topkapi, the gleaming collection that represents the splendors of Ottoman ascendancy. Here are the gems, the cradles, the armor, the dagger. Nearby are halls dedicated to a display of early clocks and celestial instruments, as well as the sacrosanct Pavilion of the Holy Mantle, housing relics of the Prophet Muhammad. In nested golden caskets are the mantle, two swords and a sacred banner associated with him.

Perhaps the greatest glory of Topkapi is largely and understandably inaccessible: the world's finest collection of Persian and Turkish illustrated manuscripts. Among them are the volumes of the *Hünername*, a biographical history of the sultans that includes depictions of their hunting prowess and exploits and the *Surname*, which commemorates the 52-day-long celebration of the circumcision rites of Prince Mehmet, son of Murat III. The books are available to scholars, but they are exhibited under glass and with only two pages displayed at a time.

Topkapi as a palace was abandoned by the sultans when, in the mid-19th century, they were much taken by the West, and particularly the French. The Janissaries were disbanded and abolished in 1826, and the sultans soon removed themselves to the notably ostentatious new palace of Dolmabahçe, built with an eye toward Versailles and a taste for French extravagance instead of Turkish. Topkapi became a sort of old-ladies' home where aging concubines and slaves served out their remaining days without the stimulation of the sultan.

When modern Turkey was born after World War I, its hero, Mustafa Kemal—known later as Atatürk, Father of the Turks—would stay when in Istanbul at the European-style Dolmabahçe Palace, which had become a kind of official guest house. All the clocks in the room where he died are stopped at the moment of his death. But he had the good taste to convert Topkapi Palace to a museum and national monument. It remains the finest example of the riches of the Ottoman Empire, of a time and a taste now preserved for all to savor.

Sunlight falls on Holy Koran in Queen Mother's prayer room, illumines faience walls and rich carpets.

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The fall of France begins in May 1940 as German tanks sweep westward behind enemy lines.

By William Barry Furlong

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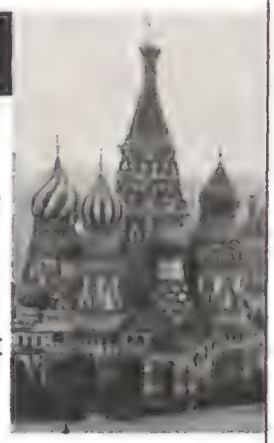

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Happy coach Clark Shaughnessy tousles hair of halfback Hugh Gallarneau as Stanford clinches victory over Cal.

On a sweltering summer day early in the 1960s, a white-shocked old tactician named Clark D. Shaughnessy uttered three words that explained one of the great turning points of the country's most urgent televised obsession. At the time he was the ranking—not to say only—intellectual in professional football. He had the rare gift of seeing ideas from a different angle of vision and applying them in quite unpredictable ways to his own life. So that summer day when I fell back on the old sportswriter's favorite "Who had the greatest impact on your field in your lifetime?" he did not reply "Knute Rockne" or "The Gipper" or even mention the prematurely canonized George Halas (who was his erstwhile boss in the Chicago Bears organization). Instead he answered, "General Heinz Guderian."

Behind that response was one of the more bizarre idea-transfers in modern cultural history. For it is well known how Heinz Guderian revolutionized land warfare with the panzer-led Blitzkrieg that brought about the fall of France in the spring of 1940. But it is not well known—or known at all—how Shaughnessy transferred Guderian's ideas from a European battlefield to American football, revolutionizing the sport.

Shaughnessy came up as a tackle-turned-fullback at the University of Minnesota in 1911-13, and went on to coach at Tulane and Loyola of New Orleans. By 1933 he was at the University of Chicago. But he was in some sense an anomaly in American sports—an athlete with a creative, inquiring mind. As a farm boy he used to recite Latin conjugations to himself while delivering milk. He had studied law, and used artillery range-finding terms to describe where he wanted passes thrown. Eventually he devised a 1,700-word language, unintelligible except to his teams, for quick play-calling on the field. Shaughnessy often went to bed by 8 P.M. and was up by 2 to 4 A.M., working out his ideas on paper or at a blackboard. He didn't smoke or drink. Driven and cerebral, he may never have been (as a football expert once put it) entirely happy "in the jovial thuggery" of pro football. "He was the theorist," recalls Sid Luckman, the renowned Chicago Bears quarterback who successfully put Shaughnessy's brilliant football theories to work in 1940, "like a research scientist locked away in his lab."

Like a research scientist at any rate,

The author, now a management consultant, for six years wrote a sports column for the Chicago Daily News.

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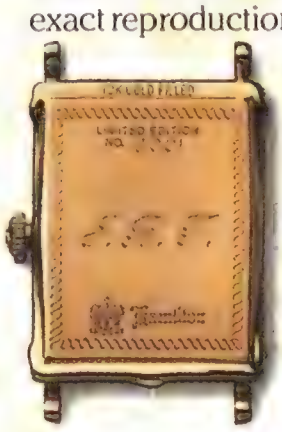

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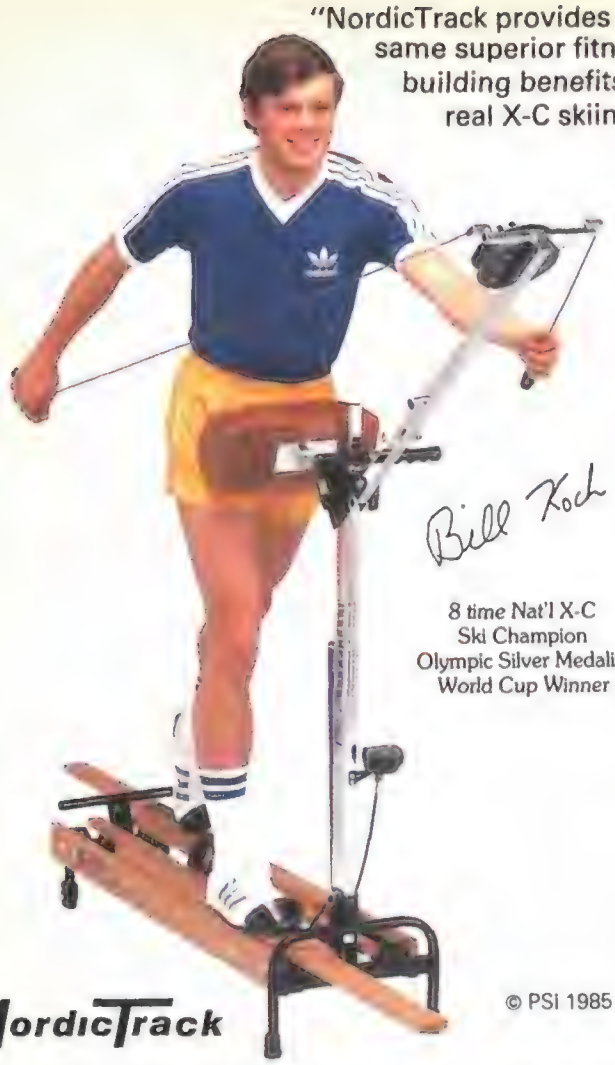

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Backed by the smoke of his successful Blitzkrieg on France, General Heinz Guderian confronts a German soldier.

Shaughnessy was totally focused on his work—on the x's and o's that gave football its graphic expression. One of his daughters remembers family meals when "we'd all be calmly eating. Suddenly Dad would leap from the table and leave the room" to put a few x's and o's on paper. "A few minutes later he'd return. 'Good play,' he would say. And then resume eating."

Once, in 1949, his car was spotted by the Los Angeles Police Department weaving back and forth in the middle of a busy boulevard. Ordered to pull over, he was recognized at once. He was coaching the Los Angeles Rams at the time—to a division title, as it happens—but that wasn't the reason. He already had so many traffic tickets for erratic driving that, in one court appearance, he'd politely inquired if he couldn't "just keep $500 here on deposit." On this occasion, Shaughnessy had what seemed to him to be a thoroughly reasonable explanation. He'd seen something on the street that suggested a play to him and, while driving, decided to sketch out the x's and o's in the condensation on the windshield.

The fierce, narrow focus of a certain kind of genius was also characteristic of Heinz Guderian, a man who was, according to British military historian B. Liddell Hart, "the quintessence of the craftsman in the way he devoted himself to the progress of a technique." In that pursuit, Guderian showed "little regard for careerist ambition, and the tact that it requires."

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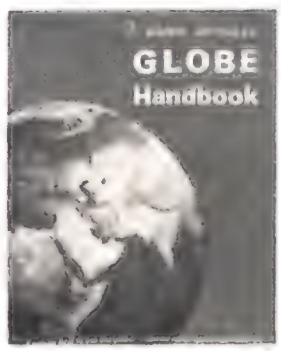

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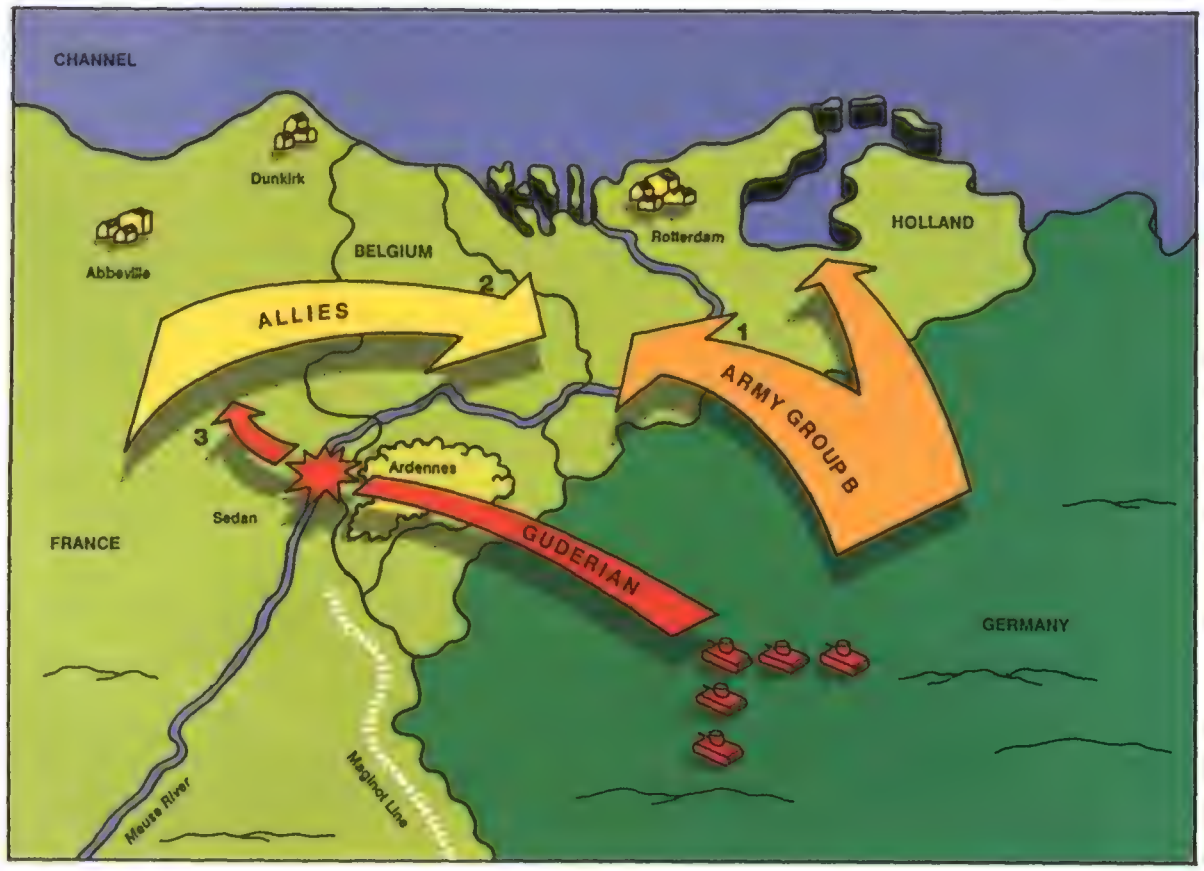


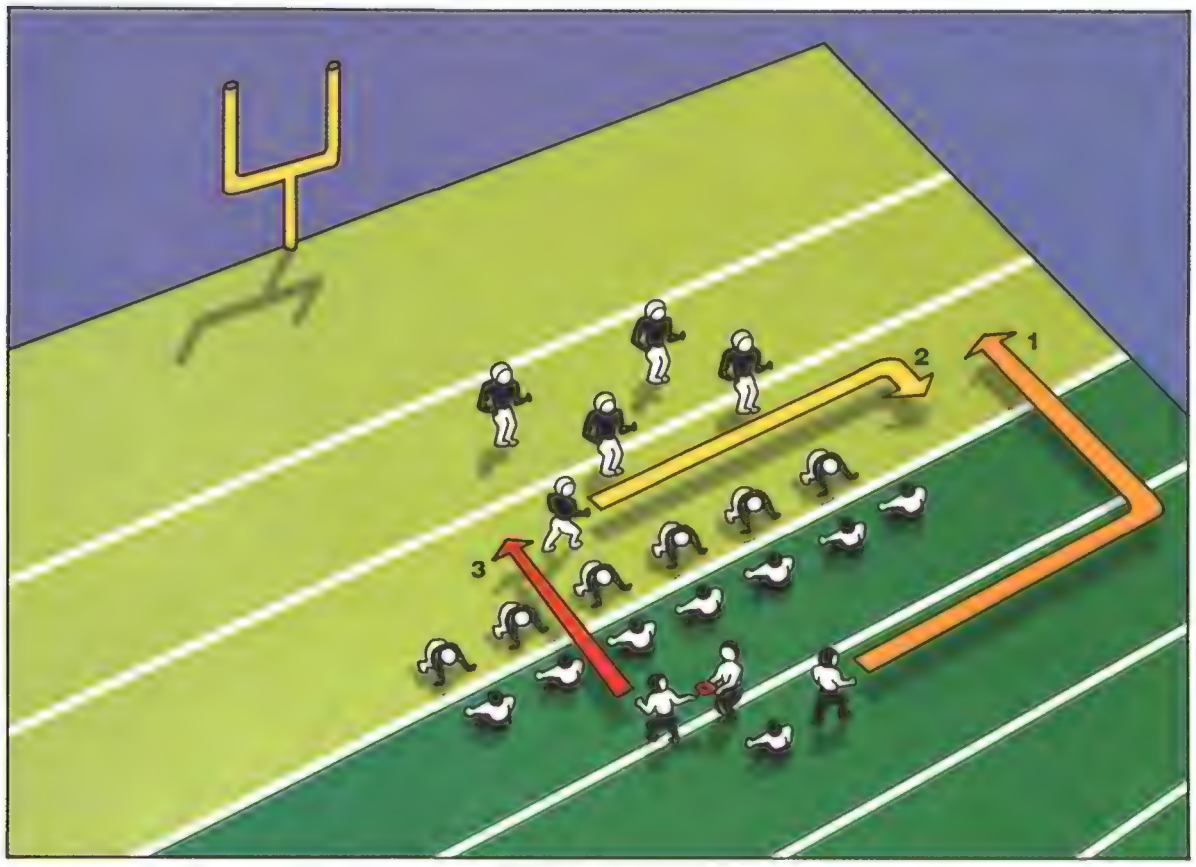
Tactical sequence led to German victory: 1) Army Group B threatens Low Countries; 2) Allies respond; 3) tank divisions punch through French line.

As it happened, another interest of Shaughnessy's was military tactics. And why not? By long tradition and persistent metaphor, football has been associated with war. Through the decades, with help from legions of overwrought coaches and sportswriters, the vocabulary grew. Line play became "fighting in the trenches." The quarterback became the "field general." A deep pass became "a long bomb." Shaughnessy perceived, however, that the analogy was not only rhetorical but real. He saw football as a "war game" in which two "armies" of equal size (11 men each) do combat over a piece of real estate (100 yards long, 53.3 yards wide) in a struggle in which the "front line" (line of scrimmage) moves back and forth on the "battlefield" (gridiron) until one side or the other plants its flag (the football—now dramatically spiked after a touchdown) in the other's most desperately-protected sanctuary (the end zone).

He went so far as to regard the kind of football played in the 1920s and '30s as a strategic reprise of World War I. That is to say, the offense was slow, ponderous, mindless and usually ineffectual. In the most prevalent strategy, the Single Wing, the ball was snapped back six yards (to the ball carrier) and then moved forward six yards (by the ball carrier), thus traveling at least 12 yards before an inch of ground could be gained. This took valuable time because there was a lot of maneuvering while the offense put as many "troops" as they could out ahead of the ball carrier.

Their duty was to run interference. That, in turn, meant that the offensive line had to immobilize defensive linemen while the ball carrier maneuvered toward the line of scrimmage. To do this, they'd have two offensive linemen block one defensive lineman around the point of attack (line of scrimmage). The defense had plenty of time to figure out what was happening and draw up forces to counter it. "Three yards and a cloud of dust" was an achievement, rooted in the trench-warfare philosophy of World War I. And it, too, led to a glorious stagnation. In 1932, the Chicago Bears, with both Red Grange and Bronko Nagurski, got to their fifth game of the season before either they or their opponents scored a touchdown.

In the years between the wars, Shaughnessy kept looking for ideas useful to football in the writings of then-unknown military strategists. Thus he was reading Heinz Guderian when Guderian had no status or celebrity. But in 1937, Guderian produced a book on tank warfare (*Achtung! Panzer!*) and a seminal article on a "war of movement" led by tanks alone. "What we want to do," he wrote, "is, for a short period of time, dominate the enemy's defense in all of its depth."



Shaughnessy's T formation used same 1-2-3 sequence: Man-in-motion forces defense to react, then ball carrier plunges through the line.

Shaughnessy had friends on the Chicago faculty translate not only Guderian's writings but the work of an obscure French colonel named de Gaulle, whose 1934 book on modern warfare, *Vers l'armée de métier* (*Toward a Professional Army*), sold only 750 copies in its first edition.

Guderian's obsession was the tank. He envisioned entire armored divisions consisting exclusively of fast tanks used as the spearhead for a "war of movement." They could, he thought, mount paralyzing strikes deep into enemy territory. Carefully planned, these might quickly defeat an enemy—or vastly reduce his will and ability to fight. But Allied and German generals alike were not impressed with Guderian's notions. They still saw the tank as the slow, lumbering creature that had been tried in World War I as a device for leading foot soldiers into battle.

Yet after a decade and a half of struggle, with a little last-minute help from Adolf Hitler, Guderian found himself in 1940, on the eve of the Germans' great assault on Western Europe, in command of three divisions made up almost exclusively of tanks. He had been given the responsibility for the critical deep thrust in a battle plan involving what the Allies least expected: speed and deception in a war of constant movement.

The German strategy of the spring of 1940 was based on the tank theories that Shaughnessy had studied in faraway Chicago. It had two stages. The first was to move toward an all-out attack on the Low Countries—hitherto neutral—and thereby draw the Allied armies, gathered south of the Franco-Belgian border, as far north as possible into Holland and Belgium (see map, opposite). This was to be done by Army Group B. With the Allies thus committed, the second stage began: to slip Guderian's panzers through a narrow hole punched in the thinned-out Allied defenses in the southeast corner of the front above the Maginot Line, and send them hurtling westward. The goal: a dash to the Channel that would cut off the Allied armies from France.

The tantalizing aspect of this plan—particularly to Gen. Erich von Manstein, who orchestrated it to exploit Guderian's ideas—was that it presented the defending armies with an impossible decision. If they responded by covering the German "motion"—the invasion of the Low Countries—they'd wind up trapped by Guderian. If they didn't—if they held their defensive positions along the Somme in northwestern France, hoping to repeat the war of stagnation of World War I—the German attack on the Low Countries would most likely sweep down the Channel on the west, while on the east Guderian's tanks might still force open a narrow hole and rush not toward the

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Stanford star Frankie Albert had quick moves needed to make the T work.

Channel but toward Paris. Best of all, Guderian could watch to see what the Allied defense was doing before deciding whether to turn south or west.

We all know what happened. The Allied armies went north. Guderian's tanks crossed the Meuse, punching a hole in the French defenses at Sedan. Into that breach he poured everything that could move—on wheels. He did not wait for infantry. He did not wait for supplies. He went without genuflecting to the precedents of war, circa 1914-18. In the new war of movement, surprise and speed were everything. He moved so hard and so fast, with tanks as his spearhead, that early on May 15, Winston Churchill, prime minister of England for less than a week, got a despairing call from Paul Reynaud, premier of France. "We have lost the battle!" cried Reynaud.

Shaughnessy's situation in the spring of 1940 was more fluid even than Guderian's. He had been head coach at the University of Chicago for seven years with teams mediocre to abysmal. In 1939 Chicago lost to Michigan 85-0, 61-0 to Ohio State, 61-0 to (for gosh sakes!) Harvard, 47-0 to Virginia, 46-0 to Illinois. When the season ended, and University President Robert M. Hutchins, who regarded football as conduct unbecoming a uni-

versity, killed the sport at Chicago, some people regarded it as less an act of intellectualism than an act of mercy.

Shaughnessy was 48. He still had tenure as a professor of physical education and served as a $2,000-a-year "consultant" to George Halas and the Chicago Bears. He had been experimenting with Guderian's tactical ideas for the Bears in 1939. But now he began translating the darts and arrows of the actual German battle to the x's and o's of football plays.

Formations that resembled the "modern" T had often been tried in football from before the turn of the century. But they never really caught on. At first they had tended to place the quarterback two or three yards behind the center, and later they were often "get-set" formations adopted before the backfield shifted to another formation—most commonly the Single Wing—before the ball was snapped. The Bears, under coach Ralph Jones, began experimenting with versions of the T in the early 1930s. Now the sequence of the German assault made Shaughnessy doubly sure that he had the key for overcoming the T's flaws while exploiting all of its previously undiscovered strengths.

Guderian eliminated infantry because it slowed the explosive attack of his tanks; Shaughnessy eliminated most backfield blocking because it slowed the explosive outburst of his ball carriers. Instead of operating over half the breadth of the line of scrimmage, like Guderian he aimed one point of attack at a narrow hole to be punched in the thinned-out defensive line while simultaneously threatening an attack on the flank (see diagram, p. 131). Shaughnessy perfected a system of "brush" blocks in which each linesman would hit—or steer or "influence"—an enemy linesman for a second or so. Under his system, offensive linesmen would stay on their feet. Then, after that first few seconds—with the ball carrier perhaps already in enemy territory—they could hustle downfield in order to get in the way of other defenders pursuing him. Like Guderian, he was looking for the deep, decisive strike.

To get explosive speed at the narrow point of attack, Shaughnessy kept his quarterback up where we see him today, literally touching the center. The other backs lined up abreast, parallel to the line of scrimmage, about four yards behind the quarterback, thus crossing the theoretical T of the "T formation."

The ball would be snapped directly up into the quarterback's hands. At the snap from center, the eventual ball carrier could rush forward and would already be going full tilt when, only a yard or two behind the line of scrimmage, he picked the ball off the hands of the quarterback, who'd pivot to his right or left to hand it off. Instead of the ball going back to the ball carrier, the ball carrier went forward to the ball.

Shaughnessy's plays provided more than speed. They provided deceptions—and offensive options—with the quarterback swiftly handing off, or faking a handoff, to any one of three backs each going in a different direction. Or faking a handoff and then tossing the ball to a back heading for the sideline. Or keeping the ball himself, either to run with it or pass. No longer granted the time for analysis, the defense now faced an attack in which it couldn't be sure who had the ball or where he was going with it. And yet the

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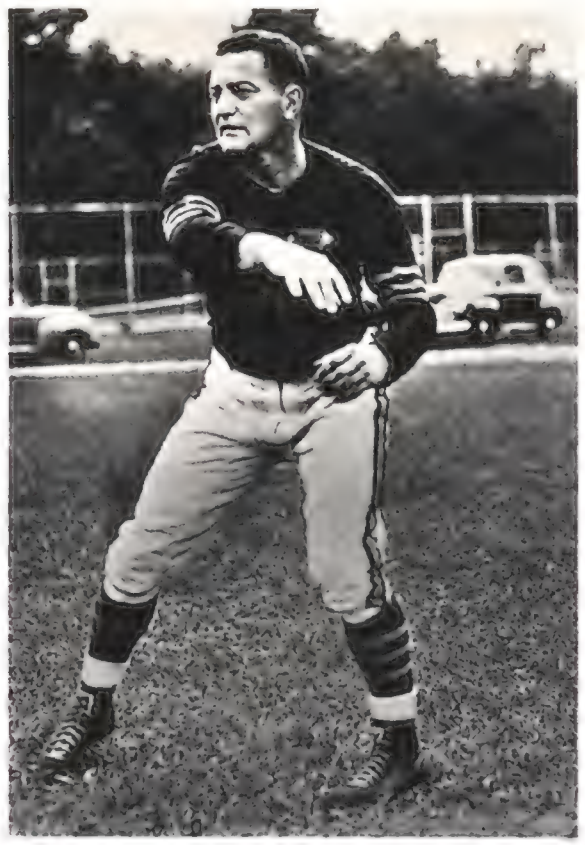

Bears quarterback Sid Luckman helped perfect the T formation in Chicago.

players on defense had to react instantly.

Perhaps more important, Shaughnessy's formation involved the passing game and a threatened attack on the flank. In tracking the sequence of the German attack on Western Europe, he perceived that the Germans opened with a very strong move to the right by Army Group B. At first this was not a direct attack on the Allies' flank. It was not comparable to an end run, for example, but more like a threatening lateral move toward the North Sea-Channel coastline—the "sideline." He could see that the Germans were trying to tempt the Allies to cover the German "motion"—which was an all-out attack on the nearly defenseless Low Countries. And as soon as the Allies were drawn north, the Germans slipped Guderian through the thinned-out membrane of the Allied defensive line and let his panzers run wild behind it in the terrain Allied forces had just vacated.

With a few creative transfers of darts-and-arrows to x's-and-o's, Shaughnessy worked out the key that would make everything else work—and so changed football forever. Just as the Germans sent a "man in motion to the right"—only it was an Army group consisting of about 29 divisions—Shaughnessy permanently added a man-in-motion to the T formation.

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right or left, parallel to the line of scrimmage but well behind it. The back would keep jogging until he took up a new position five to ten yards (or even more) outside of the end.

Now the defense would have to cover a much larger area. In offensive pass patterns, one man could go deep and one man could go short; one could go outside and one could go inside; one could curl in and turn to face the quarterback while the other faked the curl-in and sped as far and deep as possible. Because of the man-in-motion, whatever the defense did was potentially wrong.

Meanwhile, the quarterback had a chance to wait and see what the defense would do before choosing his most destructive option. Shaughnessy was not creating a new formation with his x's and o's, and his borrowing from Heinz Guderian. He was helping create modern football—swift, deceptive, explosive.

The impact of Shaughnessy's ideas was felt very rapidly. For the first two teams that wholeheartedly adopted it—one in pro football, the other a college—made football history.

Shaughnessy had discussed the T with George Halas, owner-coach of the Bears. Halas was a flinty, hard-nosed fellow dedicated entirely to the most important aspects of sport: money and muscle. He had a gift for getting the most out of players who lusted less after money than brute, animal contact, and who maintained a certain insouciance in the face of its results. In one game in the early 1930s Halas' great fullback, Minnesota's Bronko Nagurski, burst past two would-be tacklers like a man sweeping open a pair of saloon doors—and ran headlong into a retaining wall. "Golly," he said as he stumbled back to the huddle, "that last guy sure gave me a good lick." Bronko was Halas' kind of man—rich in spirit, poor in purse and willing to stay that way.

Under the circumstances, the Bears did not seem a likely market for a cerebral strategy that depended on speed and deception and constantly changing field decisions taxing to the mind. Yet Halas proved remarkably open to Shaughnessy's ideas. He not only quickly instituted the latest version of the man-in-motion T formation but he often got credit for it by tutoring the players and reassuring them about all the problems they'd face using it. "I took a look at this business of a ball carrier going without blockers," the Bears' Hall-of-Fame quarterback Sid Luckman recalls, "and I told him, 'A guy could get killed doing this.'" Halas patted him on the shoulder and replied, "You keep your mind on the play calling; we'll take care of the protection."

In their first regular-season game, the Bears met their traditional foes, the Green Bay Packers. For a long time the two teams had been evenly matched. But in 1940 the Bears won their first Packers game 41 to 10—which just hinted at the explosive potential of the man-in-motion T formation.

By that time, though, Shaughnessy was no longer consulting with the Bears. He'd given up tenure as a $9,000-a-year professor at the University of Chicago (this was still a time when a college professor could earn more money than professional football players: Sid Luckman was making only $6,000 a year with the Bears). Halas did not actually let him coach on the field. So Shaughnessy elected to put the system

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Bears owner George Halas, hoisted by joyful players after 73-0 win, sometimes got credit for the diffident Shaughnessy's ideas.

into effect himself, and in a more cerebral environment. He'd signed on as head coach at Stanford, a university with a team that was, if anything, worse than the last one he'd coached at Chicago. Finishing last in the Pacific Coast Conference in 1939, Stanford scored only seven touchdowns, won only one of nine games, and was generously described by a former Stanford player as "the worst group of players who have ever worn the Stanford red."

Shaughnessy and his new formation were not exactly cheered when they arrived in Palo Alto. Said Pop Warner, one-time coach who had been to Stanford what Knute Rockne was to Notre Dame, 'If Stanford ever wins a single game with that crazy formation, you can throw all the football I ever knew into the Pacific Ocean." All American quarterback Frankie Albert remembered: "Shaughnessy'd diagram a play and then say, 'You boys will make a dozen touchdowns with this play this season.' We'd poke each other and mutter . . . 'We didn't make that many touchdowns all last year.' " After one scrimmage in which the varsity, using the new formation, performed dismally against the "scrubs" using the older formations, Shaughnessy considered giving up the whole thing.

But in Stanford's first game—indeed, on its first scoring drive—skepticism disappeared. On one play, halfback Hugh Gallarneau caught a 17-yard pass from Frankie Albert because the defense (of heavily favored University of San Francisco) did not cover the man-in-motion. On the next play, fullback Norm Standlee went 20 yards through a narrow hole up the middle because the defense *did* cover the man-in-motion. Finally the other halfback, Pete Kmetovic, burst into the end zone on a quick-opener on which he was not even touched. ("It is entirely possible," *Sports Illustrated*'s Ron Fimrite once wrote, "that he was not even seen.") Stanford got four touchdowns that day and won in a huge upset, 27-0. "Hey!" said Frankie Albert after one score, "this stuff really works!"

It worked well enough for Stanford to roll on to nine consecutive wins, to finish the season unbeaten and untied, to go from last place to first in the Pacific Coast Conference and to be invited to the Rose Bowl. All this with almost the same team as the year before!

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game and the Rose Bowl game in the same season. It came about because Halas and the Bears were, strangely, having difficulty converting the splendid devices of the man-in-motion T formation into points and wins. They lost three games during the regular season; in one game they didn't manage to score even one touchdown. That was in mid-November when they bowed to the Washington Redskins,7 to 3.

As it happened, Stanford played its last regular-season game that same weekend and Shaughnessy now had a month free before he had to begin preparing the team for the Rose Bowl. So he answered a summons from Halas and went back East to give the Bears a refresher course before their second game with Washington.

The Redskins had the league's most celebrated passer, Slingin' Sammy Baugh. But Shaughnessy and Halas analyzed their defense and Shaughnessy worked out a series of plays for the Bears to test that defense, just to make sure it hadn't been changed. He warned that on one of these test plays, "You might score a touchdown instead." On the second play from scrimmage—the second test play—the Bears scored on a 68-yard run by Bill Osmanski, just as Shaughnessy had said they might. That took 56 seconds. After that, the Bears put on the greatest show in the league's history, scoring 11 touchdowns, gaining 501 yards in total offense, displaying the perfection of the man-in-motion T formation in all its dazzling facets. Final score: Bears 73, Washington Redskins 0. "Football," gasped the *New York Times*, "at its best."

The following week Shaughnessy began preparing Stanford for the 1941 Rose Bowl game against Nebraska, an apparently much stronger team that had a month and more to plot ways of foiling the Stanford offense. In the opening minutes of play Stanford dropped behind, but came back to win 21-13. The game and the whole season were thus matters of triumphant history: Stanford's 1940 performance was the most dramatic turnaround ever in college football.

Shaughnessy was named Coach of the Year. And by the end of the decade, some five out of every seven college teams—according to a poll by *Football Digest*—and all of the pro teams had turned to the man-in-motion T formation. Even after all these years, and all the possible muta-

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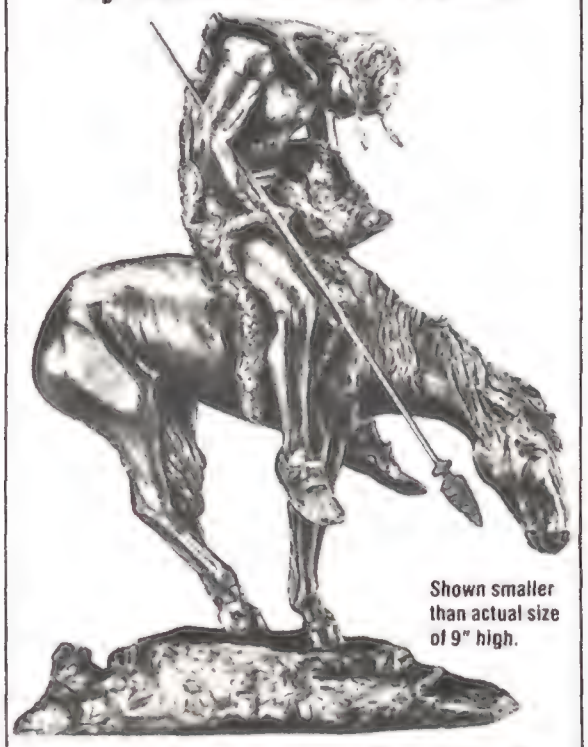

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tions and permutations, it is essentially the system we see on TV today.

Yet Clark Shaughnessy drifted into a kind of distinguished anonymity. He coached at a few places (two years at Maryland, three years at Pittsburgh and two years with the Los Angeles Rams), acted as a consultant (Washington in 1945) and eventually wound up back with the Chicago Bears in 1950 as an assistant coach. But he was never elected to the Professional Football Hall of Fame.

The question is, "Why didn't he get as much credit as he should?" The answer involves a peculiar combination of character and circumstance.

In the climate of World War II, it was not the thing to go around saying you'd just got a great new idea for American football by studying a Nazi general. For years Shaughnessy maintained a diffidence about his own accomplishments; if anyone asked, he'd say he'd just "added a little something" to the T formation. Otherwise he deferred to Halas who not only paid Shaughnessy's salary but was better at publicity anyway and often defused the question by making up silly stories that enraptured sportswriters. (One of them was that he himself had got the idea for the man-in-motion from watching the panicky reaction of the defense when one of his backs, whom he'd replaced in a game, came waddling toward the sidelines.) It didn't bother Halas, or the sportswriters, that he had a different story each time, most of which are now part of football "history." By the time World War II had been over for a year or two—and the Bears had won four NFL titles in seven years—it was a little tough for Halas to take off the halo. So Halas' legends prospered.

But Shaughnessy didn't.

He had never really fitted into the world of football. From the early days with the Bears, colleagues tended to feel uneasy with him, to harass him and even lock him out of coaches' meetings; he simply wasn't enough like them. By the time I met him he was pushing 70 and going nowhere. He had hoped that Halas would make him head coach of the Bears, but Halas was not about to do that. Besides, according to one of his daughters, Shaughnessy had long brooded about the fact that Halas had acquired almost all the credit for his ideas. He was certainly feeling his mortality and wanted a more general public to know about the intricacy of what he'd done—it was after all more cerebral and cultural than athletic.

And so, on a summer day in the early 1960s, he finally spoke to this Chicago reporter about the Guderian connection, telling me how he studied the tactical books in the 1930s, and followed the 1940 campaign and finally perfected the man-in-motion T.

Shaughnessy died in 1970. Heinz Guderian died in 1954. His place in the history of warfare is secure. But like Shaughnessy, Guderian achieved his apogee in 1940 and subsequently was humbled. He was stopped at the gates of Moscow in 1941 and was fired by Hitler, then recalled—to preside over the worst defeat the German armies ever suffered.

This year's Chicago Bears have blasted many adversaries with outgrowths of the T. Here 85 is man-in-motion, quarterback (4) waits for snap.

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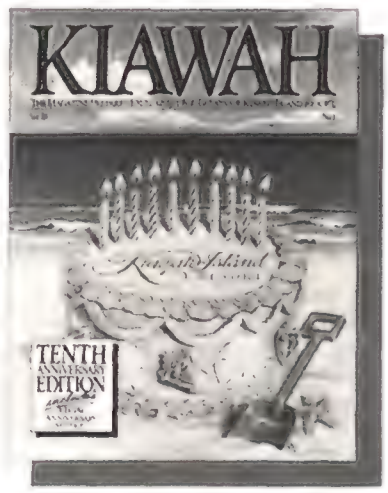

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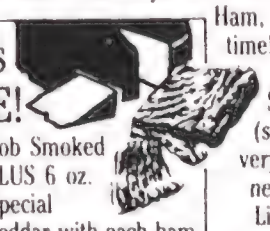

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Book reviews

The Art of Captain Cook's Voyages: Vol. 1, The Voyage of the Endeavour, *Vol. 2, The Voyage of the* Resolution *and* Adventure
Rudiger Joppien and Bernard Smith
Yale University Press, $50 each

In three voyages spanning more than a decade during the late 18th century, Capt. James Cook made the Pacific his province. He discovered new lands, described newly contacted societies and directed a remarkable program of biological and geographic research. Cook was recognized even during his life as one of the world's greatest explorers; his untimely death only added to the legend.

There was nothing accidental about Cook's success. His journeys were carefully planned to answer specific geographical problems. In addition, on each voyage the British Admiralty instructed Cook to examine the natural history and native populations of each of the regions he visited.

Cook was not expected to do all this alone. He traveled with a party of scientists, a painter and one or more technical draftsmen. These artists were brought along to produce two sorts of visual records: formal illustrations of biological specimens, and more general depictions of the peoples and places they visited. Joppien and Smith's superlative study focuses on this second category of material from the expeditions.

The Art of Captain Cook's Voyages devotes separate volumes to each voyage, with Vol. 3 not yet published. Each book begins with brief biographies of the expedition's artists and a scholarly examination of the conventions that structured their work. The authors discuss drawings and paintings from the voyages in chron-

ological order by landfall, and compare these works with the art being produced in European studios. Each chapter is extensively illustrated and an exhaustive catalog completes each book.

The voyages involved different artists working under different circumstances. On *Endeavour*, the artists were part of the entourage of the expedition's botanist, Joseph Banks (SMITHSONIAN, March 1983). Unfortunately, Banks' landscape painter died early in the journey and the biological illustrator, Sydney Parkinson (who himself died before the voyage was over), was forced to do both duties. This young Quaker was a superb botanical draftsman and sensitive to the humanity of his native subjects, but as a recorder of figures and landscapes he had a lot to learn. In the delightful language of the art-historian authors: "Parkinson's Maori warriors performing their *hakas* became bizarre harlequins and Punchinellos in a *Commedia dell' Oceano Pacifico* staged for the amused delight of their *soi-disant* rulers." Parkinson's subjects are fascinating, but he was not markedly successful as a dramatic artist.

Cook had better luck on the second voyage. William Hodges was a skilled landscapist, and he was under Cook's orders rather than attached to the scientific staff. There were still problems—Hodges ran short of paint about halfway through the voyage, he seldom paid particular attention to ethnographic detail, and his finished paintings were frequently less than strictly representational—but his portfolio includes some memorable art.

Hodges' oeuvre divides into four major categories. Several paintings record historical events in the explorers' confrontation with South Pacific societies. A series of panoramic views from the deck of the *Resolution* shows coastal profiles and native canoes, and also reveals the artist's fascination with tropical lighting and atmosphere. Some striking chalk portraits comprise a third category, while a final group of romantic landscapes depicts the supposed idylls of island life. Modern viewers will be struck by "the tenacious persistence of classicism" permeating Hodges' work and will come to understand why Cook's explorations so excited European society.

Joppien and Smith have produced a pair of magnificent studies, and if the

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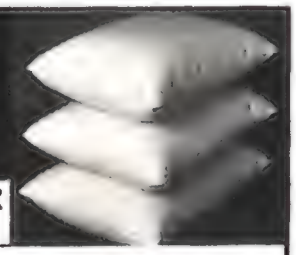

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original drawings from the third voyage (illustrating visits to Alaska, Siberia and Hawaii) are as interesting as the published lithographs, the forthcoming volume will be equally spectacular. My only regret is that these books couldn't contain more of the day-to-day details of Cook's explorations.

John R. Alden
Writer and anthropologist

The Kingdom of Coal: Work, Enterprise, and Ethnic Communities in the Mine Fields
Donald L. Miller & Richard E. Sharpless
University of Pennsylvania Press
Cloth $35/paper $17.95

The title of this absorbing history is more sweeping than it ought to be. The subject is not the whole realm of coal, but only one corner of it.

Coal as an industry is making a modest comeback, thanks to important productivity improvements, a healthy coal-trade balance and what amounts to a freeze on the building of new nuclear power plants. But the "industry" is bituminous, or soft, coal, relatively easy and inexpensive to mine and found in many parts of the world. What holds it in check today is the high cost of current technologies for burning that coal cleanly enough to satisfy environmental standards.

The "kingdom" refers to a 1,400-square-mile area of northeastern Pennsylvania, deep under which lies 75 percent of the Earth's anthracite, or hard coal. Difficult and costly to mine, anthracite is not making even a modest comeback as an industry. But, for more than half a century, it was, indeed, king.

Cleaner and longer-burning than bituminous coal, anthracite was the first widely used American coal for both domestic and industrial purposes, and a historian's claim that the American industrial revolution began in 1820 when anthracite was first shipped down the Lehigh and Delaware rivers to Philadelphia does not seem an exaggeration. The authors' account of anthracite's rise and decline is both a well-documented history of a giant American industry and a fascinating story of the unique regional culture that it spawned. But more than anything else, *The Kingdom of Coal* is an indictment of that industry for what it wrought in noneconomic terms.

"No other American industry inflicted more heedless destruction on men and

the environment than anthracite mining," Miller and Sharpless write. Without making comparisons, they manage to leave little doubt that this is so. What the text doesn't tell, the photographs show—more than a hundred of them, many of blighted landscapes and blighted men, women and children. The children bear the most poignant witness. Every fourth worker was a boy, who sometimes started his dangerous occupation at age six, normally at eight or nine. It is difficult to imagine more brutal exploitation in any other industrial enterprise.

The history of the anthracite industry, on the other hand, is not without examples of courage, ingenuity, resourcefulness, vision—even, in some places, nobility. Its pioneers recognized that early 19th-century America was still locked in an agarian economy, dependent on goods manufactured in England.

Men such as Jacob Cist and Josiah White personified the new American capitalist. Cist took advantage of a fuel crisis in Philadelphia during the War of 1812, persuading people to buy hard coal instead of scarce and expensive hardwood, not only to cook and heat their homes with but also to fire the furnaces of manufacturing industries: wire, nails, agricultural implements, glass and steel. A decade later, White and others opened the river routes and built the canals to carry coal to the cities.

Another giant of the anthracite story is John Mitchell, who in 1900 became a legend when he led the United Mine Workers in the most successful strike in the history of the industry, binding the workers for the first time into a united force that could no longer be ignored or broken up by the big companies. (John L. Lewis, who headed the UMW a couple of decades later, is portrayed in somewhat less heroic terms.)

Miller and Sharpless, who teach at Lafayette College in Easton, Pennsylvania, explain the formation of the region's coal beds 250 million years ago before they begin to relate anthracite's relatively brief history as an industry. In the 1750s, Yankee farmers from Connecticut found deposits of "stone coal" when they moved to Pennsylvania and settled the Wyoming Valley, and it was used in the forges of gunsmiths manufacturing arms for the Continental Army. But its true potential was not realized until well into the 19th century when the new American capitalists, men of "vision, tenacity, imagination and good luck—not to mention a strong dose of greed," showed the way.

How hard coal spawned a host of new industries—perhaps chiefly the railroad and machine tool—in a brief span of years is an engrossing exposition of the free-enterprise system at its most dynamic. How the industry faded as bituminous coal and coke replaced anthracite as the nation's industrial fuel, and died after the Great Depression and a series of disastrous strikes, reveals how vulnerable that system could be.

But the most memorable chapters of the anthracite story deal with the miners, a great majority of them immigrants from Wales, Ireland, Germany, Hungary and Poland, those men and boys who labored beneath the Earth's surface, in darkness, at the most dangerous job of the day. Explosions, cave-ins, floods, fires and deadly gasses were the main contributors to deaths and injuries; the "black

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lung" from coal dust sickened and killed thousands. Yet they were a resilient, fatalistic lot who, despite the variety of their ethnic backgrounds, eventually became a large and powerful brotherhood.

The anthracite story is essentially a tragedy. In a particularly moving introduction, the authors describe how, in winter, "the scarred and violated land lies exposed, a hundred and some years of industrial history bared to the leaden light." That picture conveys something of the economic and environmental costs of this vast and audacious enterprise. This rewarding and disturbing book is bound to make you reflect on the human cost as well.

James Idema
Chicago writer and critic

An Egyptian Journal
William Golding
Faber and Faber, $19.95

In 1873, the English adventurer and writer Amelia B. Edwards set out from Shepheard's Hotel in Cairo and sailed up the Nile in a *dehabeeyah* fitted out with a crew of 20, drawing rooms, a piano and servants to provide high tea. In February 1984, England's 72-year-old Nobel Laureate novelist, William Golding, set out from the Sheraton in Giza and went up the Nile in a hired cabin cruiser. It had a crew of five, plumbing as unpredictable as the crew, an engine not reliable at all, and no sign of high tea from Cairo to Luxor, 500 excruciatingly slow miles away. It's as well that Golding makes no mention of Edwards in *An Egyptian Journal*, his account of the trip; the contrast would have provoked even greater fits of exasperation.

As it is, *An Egyptian Journal* is often testy, more often hilarious (rivaling both Mark Twain and S.J. Perelman in reporting with humor the horrors of travel), always observant, honest, thoughtful and highly personal. It is, in short, everything we might expect from a formidable writer set loose on a subject that interests him and who now has reached an age to speak his mind without fear of consequence.

This "messy, upside-down journey," as it turned out to be, began with an error in planning. Golding had pictured himself sailing regally upriver with the wonders and beauties of Egypt unrolling smoothly on either side. But the boat was

small, February means low water levels on the Nile, and Golding suddenly had a prospect of sailing a thousand miles in a ditch with a view of only its banks. And so, for part of the journey, it was.

But it was Egypt nonetheless, his publishers had suggested the trip and commissioned a book, and so Golding did his best. He provided brilliant descriptions of sights along the banks—dusty villages, dustier brickfields, unfinished skeletal bridges, river traffic in all its variety—and quick but living portraits of dozens of individuals. He also fumes at the hopeless crew (who try to reunite a broken length of wire rope with nylon cord); he leaves the boat to explore remote towns and archaeological sites ("Unless you are a professional archeologist there is more interest to be found in an illustrated book of a tomb than in the comfortless, rock-hewn thing itself"); he admires the work of, and later meets, the architect Hassan Fathy; he explores an oasis. He takes an automobile trip across the desert to the Red Sea, and, only halfway there, is "overwhelmed with a positive lust for Luxor, hot baths, clean sheets, leisure, space, privacy."

Egypt sometimes throbs and sometimes merely ambles through this book. Golding is always open to it, prepared and willing to love it, but he is of necessity himself. "I had . . . now to accept," he declares near the end, casually formulating a credo for travel writers, "that whatever I wrote would not be about Egypt, it would be about me, or if you like, us middleclass English from a peaceful bit of England, wandering more or less at will through infinite complexity, not even looking for anything specific but hoping that the lucky thing would turn up." Where Amelia B. Edwards brought her world with her, Golding must apply a norm, whether he is commenting on a kebab that is "not up to Charlotte Street standards," or sadly reflecting on an ancient civilization that, these days, doesn't seem to work.

The English have a great tradition as travel writers. In *An Egyptian Journal*, Golding is as personal as Robert Byron, as observant as Norman Lewis, as descriptive as Patrick Leigh Fermor, as frank as Jan Morris and, on every page, intelligent, crusty and charming.

Alan Ryan
Novelist and journalist

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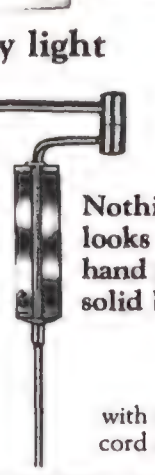

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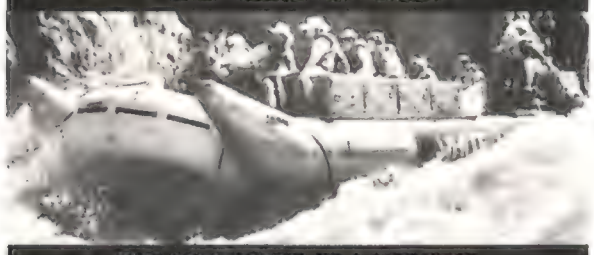

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The Rising of a New Moon: A Century of Tabwa Art (through March 17) Eighty carved ancestral figures, other objects.

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Garden Potteries and Official Kilns: Clan-sponsored Ceramics in the Edo Period (through April 30).
Life in Ancient Japan: Treasures from Recent Excavations (February 11; 8:30 P.M.) Lecture by Richard Pearson.

National Museum of American History
At Home on the Road: Autocamping, Motels and the Rediscovery of America (through August 31).

National Air and Space Museum
G.E. Lecture Series: Flying the China Clipper (February 20; 7:30 P.M.) Lecture by William Masland.

Lecture and Seminar Program

Associates in Southern California will have the opportunity to meet Smithsonian curators and scientists when the Program visits the Pasadena area, February 23 through March 2. Seminars will cover aviation history, marine biology, historic preservation and volcanology; there will be lectures on political history, southwestern art and American crafts, and a concert of jazz piano favorites. An invitation may be obtained by writing to Lecture and Seminar Program, A&I 1190, Smithsonian Institution, Washington, D.C. 20560.

Smithsonian on the air

Radio Smithsonian: features on this weekly half-hour series include a behind-the-scenes look at the revolutionary pictures of the universe and the Maori culture as seen through New Zealand's arts and crafts.
Smithsonian Galaxy: short radio features explore history, science, art.
Here at the Smithsonian . . . : two-minute TV features present the sights, sounds and behind-the-scenes activities of the Smithsonian.

To find out what stations in your area carry these radio and TV programs, write: Office of Telecommunications, MAH Room BB40, Washington, D.C. 20560.

Musical Weekend

The 14th Musical Weekend, April 25-27, will open with the traditional bagpipe salute and dinner in the historic Smithsonian castle. At the Kennedy Center for the Performing Arts, participants will hear the National Symphony Orchestra with Jean-Pierre Rampal as conductor and flute soloist. Other activities will include tea and music at the French Embassy, a performance of the Smithsonian Players and champagne breakfast in the National Zoo's Bird House.

For further information, write: Musical Weekend, Room 4124 NMAH, Smithsonian Institution, Washington, D.C. 20560.

Exhibition catalogs

Catalogs available at this time include:
After the Revolution (cloth, $24.95)
Fire and Ice, A History of Comets in Art (paper, $14.95)
Magnificent Voyagers, the U.S. Exploring Expedition, 1838-1842 (cloth, $35; paper, $17.50)
Treasures from the Land, Crafts from New Zealand (paper, $5)

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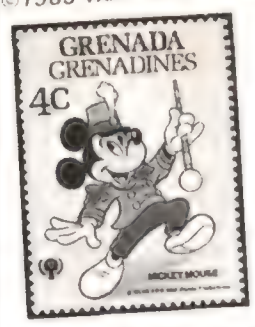

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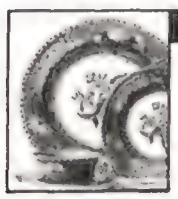

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Resident Associate events

To become a Resident Associate, or to find out about the many activities presented monthly, or for fee and ticket information, call 357-3030. Here are some February events:

India in Transition: from Mahatma Gandhi to Rajiv Gandhi (February 8) Four experts on India present an all-day seminar on modern developments.

Pioneering in the Alaskan Wilderness (February 13; 8 P.M.) Yule Kilcher tells of his flight from Nazism to the Alaskan wilderness 40 years ago.

The Impossible Theatre (February 20, 21, 22; 8 P.M.) Ensemble presents "Social Amnesia," a provocative look at America.

Richard Todd, French Horn (February 23; 7 P.M.) Pro Musicis Series recital.

Smithsonian Institution Traveling Exhibition Service

SITES circulates exhibitions to hundreds of cities outside Washington. To sponsor a show in your community, write: SITES, Smithsonian Institution, Washington, D.C. 20560. Here are some February exhibits:

Alexandria, Louisiana (February 15-March 16) *Family Folklore*, Bolton Library.

Charlotte, North Carolina (February 8-March 9) *We'll Never Turn Back*, University of North Carolina/Cone University Center.

Fort Lauderdale (February 1-March 2) *Black Women: Achievements Against the Odds*, Broward Community College.

Frankfort, Kentucky (February 1-March 2) *Images of Old Age in America*, Kentucky State University/Blazer Library.

Haledon, New Jersey (February 28-July 5) *Perfect in Her Place: Women at Work in Industrial America*, American Labor Museum.

Littleton, Colorado (February 13-March 26) *An Age of Gold: Three Centuries of Paintings from Old Ecuador*, Colorado Gallery of the Arts.

New Orleans (February 15-March 30) *Mouton Rothschild: Paintings for the Labels*, Louisiana State Museum.

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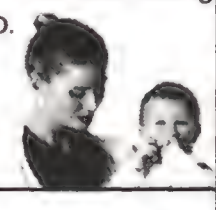

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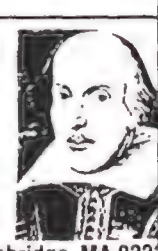

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Function follows fun for Memphis

An iconoclastic design group that started in Milan throws out the seriousness of the Bauhaus

Wild colors, aggressively juxtaposed patterns, and shapes that look as though someone got carried away with a Lego set—these are the characteristics of the influential interior-design movement called Memphis. Formed in Milan only five years ago, this group has rebelled with unbridled brio against the principles of functional design that the Bauhaus established decades ago—clean lines, coherence and, above all, seriousness.

A chair by a Memphis designer is still a chair, but why, he asks, must it be symmetrical and upholstered in dullest greige? A dining area still has as its focal point a table, but why not fill every surface in the room with a different eye-popping pattern? The results are usually functional, but rarely serious.

The drawings and prints below of furniture, interiors and fabric design are included in the Cooper-Hewitt's exhibition, "Memphis," which also brings together the best of the actual objects. Many visitors may leave the show reeling from the visual bombardment; but chances are good that, when they arrive home, their living rooms will seem a little on the dull side.

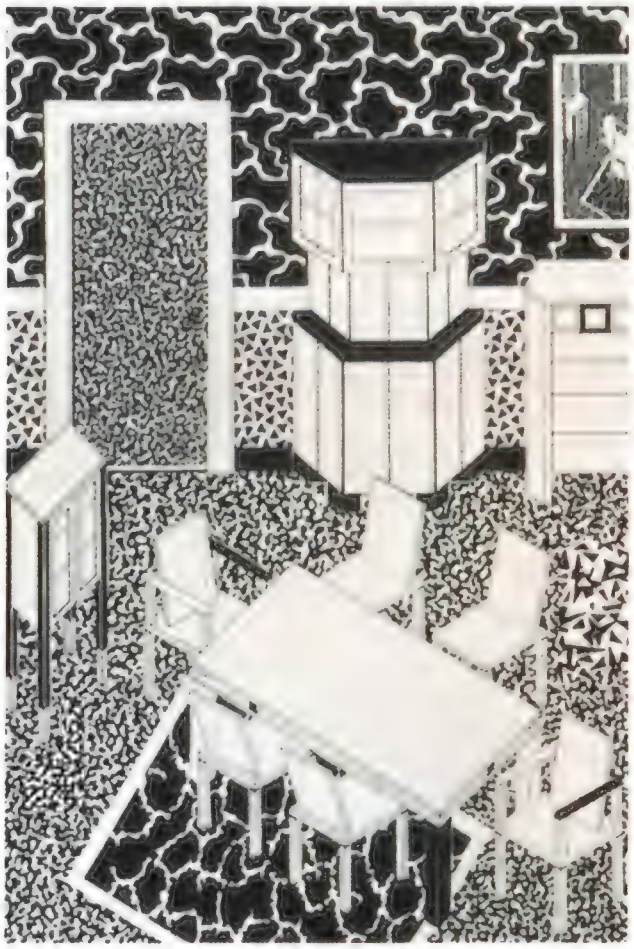
Constance Bond

Peter Shire dispensed with symmetry in designing "Bel-Air" armchairs.

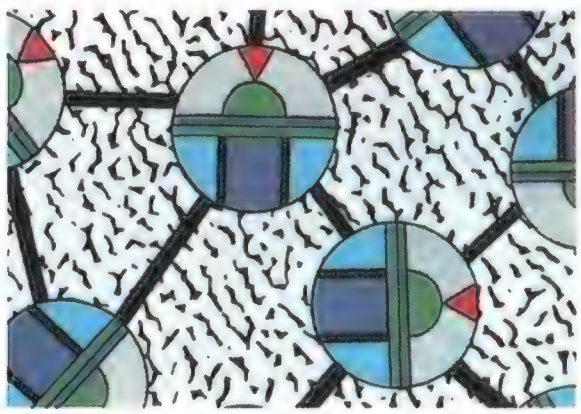
Sideboard in Aldo Cibic's serigraph plays sleek curves against zany patterns.

Potato sculpture dominates the spacious interior sketched by Andrea Branzi.

George James Sowden's dining area might be too much to take at breakfast.



Whimsical chaise (left) by Martine Bedin suggests a child's imagination at work.



Fabric design by Nathalie Du Pasquier lays Tinkertoy pattern over squiggles.

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Domestic Study Tours

Cajun Country March 31-April 7: Experience Louisiana, New Orleans jazz, Creole cooking, mysteries of the bayou.

Okefenokee Swamp April 5-12 or 12-19: Canoe and camp in this wilderness sanctuary for millions of singing creatures.

Arizona April 16-24 or April 26-May 4: Cross desert, mountains to see cacti in bloom, meet field researchers.

Arches/Canyonlands May 14-21: Explore Utah's magnificent red-rock land of deserts, canyons, rivers.

New York May 16-19: Enjoy weekend of dining, museum visits, Broadway theater.

The Hopi and Navajo May 17-27: Visit Grand Canyon, Monument Valley, Canyon de Chelly for an in-depth look at Southwest Indian cultures.

Bermuda June 2-8: Reside at Biological Research Station while exploring island's diverse habitats.

Chicago June 4-8: Walking tours to study the city's stunning architectural legacies.

Williamsburg for Families June 25-29: Parents and children 7-14 participate in Colonial activities.

Montreal/Quebec June 28-July 7: Experience France in the New World.

Grand Canyon July 11-20: Raft with expert boatmen through magnificent landscape.

Oregon July 11-28: Fresh sea air, wild flowers, mountain vistas and historic lodges highlight this outdoor adventure.

Waterton-Glacier International Peace Park July 11-22 or July 25-August 5: Hike the backcountry with naturalist guides through Alpine meadows to mountain chalets. Experienced hikers will thrill at vistas.

Crow Canyon Archaeology August 24-31: Join archaeologists near Mesa Verde, Colorado, to participate in a dig.

Alaska's Inside Passage September 20-30: Cruise from Ketchikan to Seattle; see killer whales and turquoise water of Glacier Bay.

Washington "Anytime" Weekend: See "The Treasure Houses of Britain" (through March 16). Enjoy private tours and luxurious accommodations for a perfect weekend getaway. Must reserve ten days in advance.

Foreign Study Tours

People's Republic of China: Ten unique itineraries: hike, travel by train, study decorative arts, visit Nepal and Tibet . . . tours for first-time and repeat China travelers.

Mexico February-March: Study archaeology in the Yucatán peninsula.

A Hike in New Zealand March 4-20: Discover wild flowers, crystalline lakes, snowcapped peaks on the Milford Track.

Blue Whales of Mexico March 9-16: See Halley's Comet while cruising the Sea of Cortés in search of whales.

Shadows of the Past—Chateaus, Caves and Villages of the Dordogne: April 5-19 or April 19-May 3: Explore this fascinating region of France. Includes four days in Paris.

Portugal April 9-23: Sample Lisbon's diverse charms and those of the countryside.

Istanbul & Beyond May 1-17: Six days in the city, then travel to Central Anatolia and Cappadocia, the Aegean and Marmara coast or the Mediterranean and Aegean.

Roundabout Italy May 6-23: Relaxed sailing from Venice to Genoa.

Springtime in Sicily May 9-22: Delight in an island harboring monuments from classical Greece to Baroque periods.

London and the English Countryside May 11-25: Exciting city program, travel to country homes, gardens and historic sites.

Spring in Norway May 19-June 1: See International Festival performances by musicians in Bergen. Then on to Oslo.

Danube Journey May 20-June 7: Explore castles, cathedrals and museums from Bucharest to Vienna.

Florence Seminar May 30-June 15: Stay in a villa and study the Renaissance.

Paris to Beijing by Train May 30-July 4: Join adventurous fellow Associates for an experience of a lifetime.

Irish Walk June 2-14 or September 5-17: Take day hikes through a variety of settings in the Ring of Kerry and Connemara.

Wild Highlands of Scotland June 5-23: Enjoy the outdoors while studying about this area's cultural and natural history.

Europe by Train June 11-30 or August 13-September 1: Luxury and splendid vistas on *Orient Express*, Switzerland's *Glacier Express*, France's swift *TGV*.

Island World of Britain June 15-July 3: A circumnavigation to explore ancient ruins, great houses and remote hamlets.

Perspectives on Mediterranean Civilization June 22-July 6: Gain new insights into history, art, architecture in Italy, France, Spain, Morocco and Portugal.

Countryside Programs From June to September: Explore scenic and historic areas in Switzerland, Austria, Italy or England.

Write National Associates, Capital Gallery 455, Smithsonian Institution, Washington, DC 20560 or call (202) 287-3362 for tour brochures

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Smithsonian Seminars at Appalachian State University

June 25-28, 1986

Smithsonian seminars will travel south this summer for a series of four-day programs at Appalachian State University. Located in the beautiful Blue Ridge Mountains of northwestern North Carolina, the University enjoys a delightful summer climate. The seminars are especially designed to take full advantage of the natural and cultural heritage of the Southern Appalachian region. Expand your educational horizons as you join fellow Associates for stimulating seminars on American art, creative writing and fossil identification.

The New Eden: A Century of American Art

Art historian William Kloss shares new perspectives on 19th-century American art as he traces the development of painting from the rapturous works of the Hudson River School through the Luminists to regional landscape art as esthetic expressions of American optimism. Visit the Hickory Museum of Art and the Reynolda House Museum of American Art to view splendid American painting from this period.

The Art and Craft of Creative Writing

Study the successful techniques of creative writing with Edwards Park, author of SMITHSONIAN's monthly column, "Around the Mall and Beyond." Learn how to establish a novel point of view and discover how to appeal to the senses through artfully chosen words and images. Explore North Carolina's literary heritage with visits to Connemara, (Carl Sandburg's home in historic Flat Rock) and the Thomas Wolfe Memorial in Asheville.

Identifying Fossils

Appalachian State University is surrounded by mountains which some scientists believe to be among the world's oldest rock formations. Explore this region with paleontologist John Hanley and University faculty members during lectures, hands-on workshops with fossil specimens and a field trip to local areas of geological interest where you will see striking fossil and structural evidence of the crucial events that shaped our continent.

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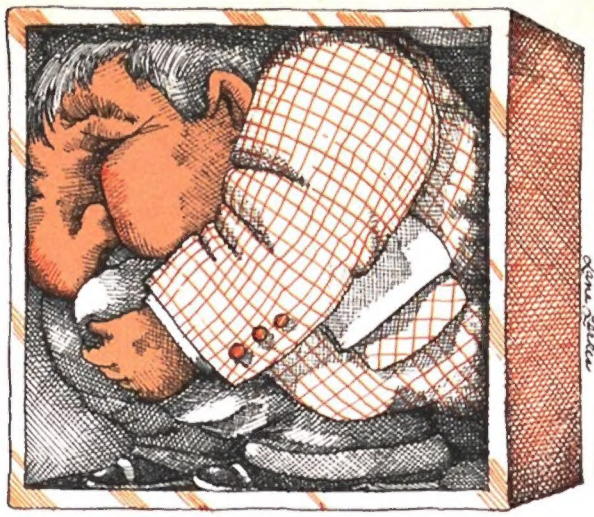

Hang on, microworriers—here comes 'angstology'

A recent newspaper photograph straight from *The Twilight Zone* showed two Las Vegas matrons in designer jeans running in terror down a residential street, chased by a six-foot, 200-pound ostrich.

That incident reveals a peculiarity of modern times—our unprecedented richness of opportunity for worry. Earlier eras had simpler dreads such as the wrath of the Norsemen, the Black Death or a visit from the Huns. But modern anxieties are far fancier. Aboriginal Nevadans, after all, had no reason to lie awake in their brush shelters worrying that a vast African bird might escape from a truck en route to a Minnesota zoo and chase them down a Las Vegas sidewalk.

We live in the Golden Age of Worry, when at any time a tenth of a ton of feathers and drumsticks might be pecking at your nape. To cope, we need a new science of anxiety—something called "angstology" perhaps.

Consider the grand-scale macroworry, such as the current fret that civilization's gaseous exhalations will warm the atmosphere, melt the ice caps and raise sea levels. Angstologically speaking, it is iffy, for while some might mourn the inundation of, say, Yankee Stadium, others would applaud the same event. And many would welcome a cod and haddock fishery off the Kansas coast.

Higher on the angstology scale is astronomy's new theory that the dinosaurs died because the Earth periodically gets whammed with comets or huge meteors. In theory, this Cosmic Death will strike again, an appropriate worry for mental review just before falling asleep, when you peek through the bedroom window at the black night sky. But comet barrages are out of our hands, which weakens this particular item's anxiety quotient.

By contrast, physicists Piet Hut and Martin J. Rees, of the Institute for Advanced Study in Princeton, New Jersey, have dreamed up a beauty. They have a notion that new particle accelerators may create subatomic collisions intense enough to trigger a chain reaction and thus vaporize the entire Universe!

Such a macroworry is exquisite. While we stand by, physicists are planning giant accelerators. A scientist in a white smock will soon throw that switch. And for thousands of people the last thought, before the cosmos winks out, is sure to be, "Darn, why didn't I start a petition?"

Most of us are microworriers, though, small-scale fretters. Nibbling at our minds are such up-to-date worries as whether or not our insurance policies will be cancelled if we have the gall to file a claim. (For really Baroque Worry, as it has been called, consider the case of a friend of mine whose insurance man keeps pressing him to protect his house against suitcases falling from airplanes.) We take on about the approach of killer bees, indoor air pollution and the possibility that a tire will blow on a jammed bridge during the 6 P.M. traffic snarl.

One angstological theory traces such habitual jitters to the medical community's propensity for issuing Dire Warnings. Years ago, for instance, warned that the unexercised heart is at risk, I took up running. Now University of Massachusetts psychologists accuse runners of addiction. I would switch to long vigorous walks, but the Pennsylvania College of Podiatric Medicine in Philadelphia warns that walking can wear out cartilage in the kneecap, cause stress fracture, tendonitis and joint trouble. Meanwhile, runners face a new danger: Swiss researchers are reporting scalp lacerations from bird attacks. Their conclusion, noted in the British journal *Lancet*, is chilling: "Joggers should be aware that nature has its own laws and may not allow intrusion without revenge."

That is why we must all be alert for vindictive rock formations. In Jacksonville, Florida, recently, a sinkhole opened, swallowing a motorcycle, a Blazer, a family sedan, two trucks, a garage and a couple of royal palm trees.

Also look out for public-works projects, especially in Buffalo, New York, where bridge painters recently went wild. Besides the bridge, they spray-painted 2,300 parked cars, about 90 boats and several streets and buildings with what residents are calling "DOT green."

Beware of neighbors. A Maple Heights, Ohio, couple sued the folks next door for painting their garage with "a large red face with its tongue sticking out." In Goshen, Vermont, police raided the town clerk's home and found 1,000 marijuana plants and a rocket launcher.

All microworriers should be aware that in California, using dirty underwear as rags is a crime. So is selling cotton at night in Mississippi and playing marbles at any time in downtown Winoma, Mississippi. A Port Orange, Florida, plumber was showering when a rifle butt bashed his bathroom window and a man climbed in. The local SWAT team had staked out the wrong home. Towel, sir?

And then there was the Baton Rouge man who complained about his refrigerator repairs. The repairman pulled a gun, wounded him and also shot his refrigerator. Franklin Roosevelt admonished that we have nothing to fear but fear itself. But he was unfamiliar with the case of a Satellite Beach, Florida, man who recently mixed two common cleansers while sprucing up his toilet bowl. As he walked out to answer a phone, the cleansers gurgled. And then—here in the Golden Age of Worry—the toilet blew up.

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100 years ago, these visionaries rocked, shocked and scandalized Paris.

They were branded as "Impressionists"—and museums refused to display their work.

Now, for the first time in this century, you can see many of the paintings that caused all the fuss. In an extraordinary exhibition based upon the 8 original shows organized by the Impressionists themselves.

AT&T is honored to bring you *The New Painting: Impressionism 1874-1886* at the National Gallery of Art in Washington, D.C. (January 17-April 6) and at the Fine Arts Museums of San Francisco (April 19-July 6).

This show is truly a celebration of vision—a new vision that changed forever the way we look at the world.

AT&T. Bringing you great art and great artists.

Woman with a Parasol—Madame Monet and Her Son, Claude Monet, National Gallery of Art, Washington, Collection of Mr. and Mrs. Paul Mellon.

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